The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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The Fate of the Act

So far as the House of Commons can decide it, the fate of the Dyestuffs Act has been settled. The measure is to lapse on the appointed day in January after running for ten years. Under its protection, during that time, results have been achieved that no one ten years ago would have thought remotely possible. It might almost be true to say that what it took this country some forty years to lose, it has taken it ten years to recover. And now having recovered our lost dyestuffs industry, our highly imaginative statesmen like Mr. Tom Shaw can see no use for any special measures to secure its continuance. The industry, says Mr. Graham with a parrot-like persistency, is now established; why, therefore, bother about it any more? Whether it remains or disappears would seem to be a matter of complete indifference to the Government. Never surely was a really serious issue treated with more cynical flippancy.

Now that the decision is known, some of the users, it is reported, are beginning to wonder whether the opponents of the Act may not have won for themselves a Pyrrhic victory. Even so incorruptible a free-imports authority as the *Manchester Guardian*, probably recalling the number of its own neighbours that the industry employs at Blackley, Huddersfield and a few other centres, has suddenly become perturbed. It recognises at least the risk to which the withdrawal of the Act would expose this country, of an influx of cheaper foreign dyes intended to kill the home industry. If this should happen, then it allows, there may be a case for re-imposing some licensing system. "But," the argument seems to run, "don't do anything to safeguard yourselves against the possibility of damaging the industry. Let us cheerfully take the risk, and then, if and when the industry has been seriously damaged, we shall be prepared to consider steps for repairing the damage." Knowing the present state of unemployment, the importance of the dyestuffs industry from so many points of view entirely unconnected with politics, it is difficult to appreciate such an attitude of mind.

The Tercentenary of Cinchona

ON Monday afternoon an international exhibition of exceptional historical and medical interest was opened in the Wellcome Historical Medical Mission, London, and will remain open for inspection by delegates and others interested until February next. It was organised by Dr. Henry S. Wellcome and his staff, with the assistance of various learned societies and private firms, in connection with the tercentenary celebration of the first recognised use of cinchona by Europeans in 1630. The exhibition was formally opened by Cardinal Bourne, and addresses were delivered by the Spanish and French Ambassadors and the Peruvian Minister. The speeches, like the exhibits themselves, had a truly international note. Speaking of the history of the rare remedial qualities of the Peruvian bark from which quinine is prepared, the Peruvian Minister stated that Spain, through the labours of Jesuit missionaries, discovered it, brought it to Europe, and gave it to the world; Italy contributed to its diffusion and prestige; France popularised it; Great Britain and the Netherlands made it cheaper and more accessible to mankind.

The exhibits which Dr. Wellcome has succeeded in bringing together constitute the most comprehensive collection of specimens of cinchona and of objects associated with the history of quinine ever assembled, and one that is really worthy of so notable an occasion. It is satisfactory to know that, owing to the period for which the exhibition will remain open, ample opportunity remains for its inspection. Not the least valuable of Dr. Wellcome's services is the issue of a beautifully printed catalogue of the exhibits, with explanatory and critical notes. The collection of objects is much too large and varied to permit of detailed notice, and readers who are really interested in such matters should not

fail to see the exhibition for themselves. As illustrating its representative and authoritative character, it may be said that the King of Spain has lent specimens of the bark brought back from Peru by Ruiz and Pavon in 1777, and of the leather-cased serons (both for mule-packs and human beings) in which they carried the cinchona bark to Carlos III. The Spanish Ambassador, the Consuls-General of Ecuador, Bolivia, and Peru, the India Office, and the Imperial Institute have collaborated with the historical and scientific organisers of the exhibition. The Royal Society, the Linnean Society, the Medical Research Council, the Royal Geographical Society, the Society of Apothecaries and the Chelsea Physic Garden, the Pharmaceutical Society, the Royal Botanic Gardens at Kew, and the Royal Botanic Society are among the numerous learned bodies from all parts of Europe which have made loans of interest. Private firms and research institutes and individual scientists have provided documents, pictures, and botanical specimens.

Captain T. A. Joyce, of the British Museum, has lent a volume of the early manuscript journal kept by Sir Clements Markham, who was responsible for introducing the plant to India, and the Secretary of State for India has lent the original volume of official correspondence in manuscript (1859–70), relating to Markham's expedition and its results. The Wellcome Historical Medical Museum supplements these with the original permit issued to Markham by the Peruvian Minister of Foreign Affairs, and the Departmental reports and Blue-books which Markham himself annotated in manuscript. The work of organisation has been very efficiently done, and congratulations may be offered to all responsible.

Chairs in Analytical Chemistry

MR. CHASTON CHAPMAN, in a letter that appears on p. 547, raises again the important question of the establishment of Chairs in Analytical Chemistry in British universities. It is rather notable that while the United States, Germany, Switzerland, Belgium and other countries recognise analytical chemistry as a distinct branch of chemical science and make provision for its teaching, Great Britain is still without a single chair in this subject. It cannot be contended that it is all covered in the existing courses on fundamental chemistry, for specialisation has proceeded so far as to necessitate the division of "chemistry" into several groups for teaching purposes, and analytical chemistry has a field and a technique of its own quite as distinct as that of other specialised branches which are recognised for university purposes.

There can be no doubt that analytical chemistry is steadily increasing in importance and public recognition. The functions of the public analyst, for example, cover a very wide and important field, and they are more likely to grow than to diminish in the future. In the legal and criminal field the analytical chemist is being brought more than ever into service, and here qualifications of a highly specialised character are essential. Once it is admitted that chemistry is too big a subject to be taught as a whole, at least in cases where a limited period only is available for study, the analysts have good ground for the claim to have their branch recognised. From the university point of view, the matter would probably be mainly one of finance and time tables. If anyone were prepared to endow a chair in analytical chemistry, most universities, we imagine, would welcome the offer; in the absence of such provision the authorities would have to consider the relation of income from fees to the expenses involved in the creation of a separate department. Ways and means would, of course, have to come in, but assuming these difficulties to be overcome, there could be no valid objection to establishing a professorship of analytical chemistry.

High Production Costs

THAT the costs of production throughout British industry are far too high is the conclusion arrived at in an unusually outspoken pamphlet issued by the Engineering and Allied Employers National Federation under the title, *Realities and Problems*. This document can be recommended for the widest possible circulation, not only for its sound economic sense, but because the argument advanced in it is not involved in any way with any political controversy. The engineering employers are concerned as a finishing industry to reduce not only their own costs but what they call "pre-charges" which they cannot escape. Chief among the "pre-charges" is the enormous burden of State taxes and local rates. The engineering employers emphasise that the heavy drain caused by official demands is not only rendering the exporting industries less and less able to compete in the markets of the world, but that it is having a weakening effect on what are called the sheltered trades. They have made out an urgent case for national and local economy, and support to the full every argument advanced by Sir Ernest Benn in his recent book, *Account Rendered*.

The Calendar

Dec.		
15	Institute of Fuel: "Private Generation of Electricity Versus the Grid." Major E. Ivor David. 7 p.m.	Engineers' Club, Albert Square, Manchester.
16	Newcastle Chemical Industry Club: "An Astronomical Talk." G. R. Goldsborough. 7 p.m.	5, Lovaine Row, Newcastle.
17	Society of Glass Technology. 2 p.m.	London.
18	Institution of the Rubber Industry: "The Use of Concentrated Latex in the Rubber Industry." J. H. Carrington. 7 p.m.	The Manchester, Ltd., Royal Exchange, Manchester.
18	Chemical Society. "1-ω-halogenoalkylisoquinolines and their derivatives." R. Child and F. L. Pyman; "A synthesis of hydrastine.—Part I." E. Hope, F. L. Pyman, F. G. P. Remfry, and R. Robinson. 8 p.m.	Burlington House, London.
19	Society of Chemical Industry (Newcastle Section) and Coke Oven Managers' Association: "Coal as a Raw Material." Dr. E. F. Armstrong. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
19	Institute of Chemistry (London Section): Gluckstein Memorial Lecture by Dr. A. E. Dunstan. 8 p.m.	30, Russell Square, London.
19	Society of Dyers and Colourists (London Section): "Emulsifying Agents, Textile Assistants and Finishing Materials: Their Examination and Valuation." Dr. Callan.	Burlington House, Piccadilly, London.

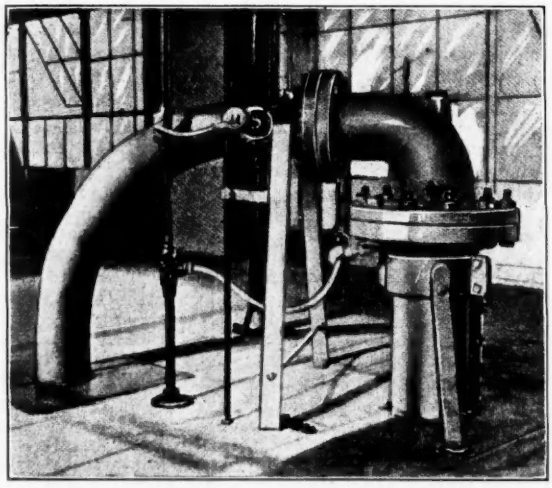
Synthetic Nitric Acid Manufacture

Description of First Canadian Plant

An interesting account of Canada's first synthetic nitric acid plant situated at Beloeil, near Montreal, is contained in a recent issue of "Canadian Chemistry and Metallurgy," from which the following extracts are taken. The district of Beloeil, which includes McMasterville, the home of Canadian Industries, Ltd., is a growing and important centre of chemical enterprise in the Dominion.

THE ammonia which at Beloeil is transformed to nitric acid is manufactured at Sandwich, Ontario, and shipped in tank-cars to Beloeil. The plant is located at this point because nitric acid is required for the manufacture of explosives and the site is suitable for the production of fertilisers and ammonia chemicals.

The raw material is synthetic ammonia—pure and anhydrous. The estimated possible plant capacity is twenty tons per twenty-four hours of 100 per cent. nitric acid. This is the equivalent of several large sodium nitrate stills. The product is a pure acid, suitable for ammonium nitrate manufacture, but requiring concentration for glycerine nitration. The plant is of steel frame construction with brick on the lower storey. This gives unusual lighting facilities because of the glassed-in effect secured on upper storeys. The equipment is arranged in line, so that the plant is relatively narrow and high. There are no solid floors to obstruct daylight; thus the whole works is easily visible from most inside points. The cost, in round figures, is estimated at $300,000, and a very high percentage of this is due to the special equipment required, mainly high-chromium low-carbon iron and



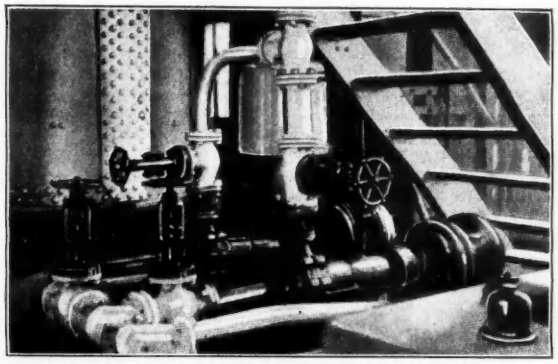
THE CONVERTER, SHOWING SOLID NICKEL PIPE ON RIGHT.

pure nickel. When a bolt costs several dollars, it does not take long to run up totals.

It is necessary to see and study closely the new plants of this type to understand how the metallurgist and those responsible for the newer alloys, capable of withstanding specific types of corrosion, have made chemical manufacturing look so simple and free from trouble. In a works of this kind, nickel, pure and in quantity, is required for hot ammonia vapours and air; and once the catalyst is passed, chromium iron is required for the oxidation products. Chromium iron also conveys ammonia prior to its mixture with air. A trace of chlorine or chloride would ruin equipment that meets most difficult conditions otherwise. Distilled water is the only kind known in this process. The air used is filtered and carefully prepared.

The system pressure is about one hundred pounds. The converted gases reach a temperature of around 930° C. and pass through heat exchangers to absorption vessels where the temperature is 300° C. The conversion runs from 97 to 98 per cent. of ammonia delivered to the system and the absorption is quite as high, giving a total yield on the process of at least 95 per cent. This is a very high efficiency in a plant of this kind. The works, taken as a whole, represents the accumulated experience of the best chemical engineers at the command of the largest chemical organisations in England, the United States and Canada.

Pressure control is most essential, together with temperature regulation, as the reaction gives out heat. A solenoid

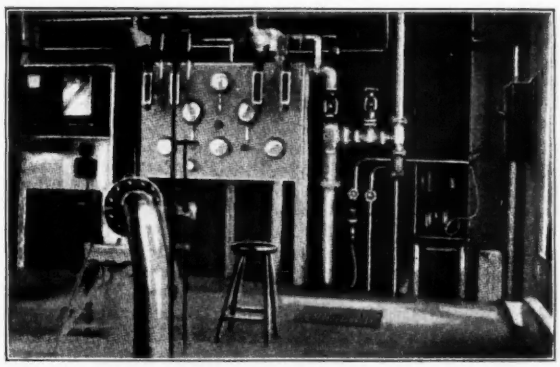


LA BOUR PUMP MADE OF ALLOYS RESISTANT TO NITRIC ACID.

valve, controlled by a Penn automatic switch, regulates temperature and is located in the gasifier. The pressure control is located in the air header. The ammonia gas is filtered and passes to a gas mixer and thence to the converter. All ammonia lines are traced with steam pipes so that no condensation can occur if the plant is shut down.

The Converter

The converter is the heart of the process and consists of a relatively small vessel, little more than a foot in diameter, as it appears, and quite short. The ammonia gas and air, when the mixture has been prepared, enters the converter through a pure nickel pipe made from a billet of the metal that was bored and bent cold. Since the outside diameter of this pipe is above six inches, some conception of the cost of such equipment is secured. The head piece of the converter is a nickel casting and the catalyst is visible through a small glass peep-hole. Once the reaction chamber of the converter is passed, the alloy used is again high-chromium low-carbon



CONTROL ROOM WITH INSTRUMENTS FOR RECORDING TEMPERATURES AND PRESSURES.

iron. Thermo-couples constantly record temperatures before and after conversion and at other points.

From the converter, the oxides of nitrogen pass through cooler condensers and an acid separator. The cooler condensers are steel tanks with chrome iron condensers in each

As is frequently the case, the absorption column is the most imposing piece of equipment in the system. It measures about 5 feet 6 inches in diameter and is 28 feet high. It is a cylindrical, closed pressure vessel, divided into four sealed compartments by diaphragms. It is sealed so that acid and gases can be drawn off at three different levels and cooled. The gases enter at the bottom and pass through bubbling plates or towers which consist of capped openings in plates water sealed. This forces the gas into intimate contact with water and acid solution a number of times in its passage through the tower. Arriving at the top of the lower chamber, the gas is drawn off and passed through a coiled cooler before it enters the tower again at the bottom of the next chamber. There are some twenty-four perforated bubble plates in the several sections of the tower. This system of "bubbling" towers has superseded the packing type of tower for absorption work of this type.

Acid Absorption

The acid finally passes through weigh tanks, and is pumped by La Bour pumps to acid tanks as pure 60 per cent. nitric. The volume control on the system is on the main air supply and is of the Brooks automatic type. Hand controls for liquid ammonia, the gasifier, the heat exchangers and the air control are placed near the converter. Flow meters are in evidence on the control board and the exhaust stack is tested every hour for oxygen and nitrogen oxides. An interesting point about the exhaust line is the precaution to avoid freezing. The exhaust is carried on in definite stages with this in mind and has a steam ejector to start the system.

As a piece of chemical engineering, representative of the newer types of plants that are being constructed to-day, this nitric acid works is a distinct contribution to progress. Nothing has been left to last-minute adjustment with consequent disfiguration of the plant lines as a whole. The last detail has been well engineered. At a distance one could fancy, since the plant is relatively small, that the whole works might be transferred, as a perfect working model of a process, right to the lecture-table or to some exhibit of chemical equipment. Spotless and automatic, it can proceed to turn out sixty per cent. nitric acid from ammonia indefinitely, one could imagine. Beyond the chemical and general engineering principles involved, the lasting conception that so impresses a visitor to such a works is the ease with which reactions go forward in vessels, pumps and lines that are designed to withstand corrosion when the necessary elements, such as temperatures, pressures and catalytic factors, have been determined. In a plant of this size, it is possible to observe the process as a whole from several points in the building, which adds much to the ease with which the operations can be followed.

Dyestuffs Act Debate in House of Commons

Defeat of Conservative Effort to Prevent Expiry

The fate of the Dyestuffs Act was sealed in the House of Commons on Thursday, December 4, when an amendment to include it in the Expiring Laws Continuance Bill and continue it for a further period was defeated by 30 votes.

A number of very fine speeches were made in a Conservative attempt to save the Dyestuffs Act when the House of Commons went into committee on the Expiring Laws Continuance Bill on December 4.

Sir P. Cunliffe-Lister

Sir P. Cunliffe-Lister (C., Hendon), moved an amendment to include in the schedule of Acts to be continued the Dyestuffs (Import Regulation) Act, 1920, for a further period of five years. The Act, he said, would come to an end at the beginning of next month unless the amendment was accepted, and the Government had delayed announcing its decision not to include it in the Bill until a month or two before its expiration. It could not be said that the Government had reached that decision as the result of any exhaustive inquiry. All they asked by this amendment was that foreign dyes should be prohibited from coming to this country, where the British maker was able to supply a British dye as good in quality as the foreign dye and at the same price as the foreign maker charged to the textile industry in his own country. This was not a question of Protection or Free Trade, although it was true they sought protection against dumping. This was an industry which was British in origin. The great pioneer work was done in this country, but before the war it had become almost extinct, and during the war we could not produce the khaki dye for our uniforms and had to scour neutral countries to get it.

Dealing with the progress made in the industry in Great Britain since the war, Sir Philip said we were now producing over 90 per cent. of the dyes consumed in our home industries as compared with 20 per cent. before the war, and our export trade had gone up from 4,000,000 lb. weight in 1922 to 15,000,000 lb. weight at present. Equally remarkable had been the progress in regard to quality and colour. That had given a tremendous impetus to the artificial silk industry. Subsidiary industries had arisen and created much prosperity. He declared that if the Act were discontinued there would be concentrated dumping from abroad, and Germany would regain the dominating position she held in the industry before the war. The reasons advanced by the Government for their action were very slender for jeopardising any industry, and still slenderer for jeopardising what was perhaps the most vital key industry in the country. He was only asking for the maintenance of prohibition where British dyes were equal in quality and price to the foreign product. He begged the House to give to the industry some further help and not to stay so hopeful a venture.

Sir Herbert Samuel

Sir Herbert Samuel (L., Darwen) agreed that the dye industry must be regarded as a special case. There were exceptional factors which required the special attention of Parliament. The House should express their gratitude of the leaders of the industry and their chemists and engineers. By their strenuous work they had increased opportunities of employment and added to the wealth of the nation.

The Dye Stuffs Development Committee, which was representative of all parties in this controversy, had issued a report which pointed out that the main object of the Act had been achieved, and added: "It is obvious that any form of restriction is a hindrance to the consuming trades." That was a very important announcement. Even more important was, the statement of the committee that there was a tendency on the part of the British industry to concentrate on those materials for which there was a comparatively large demand and to leave those for which there was a relatively small demand to the foreign maker, particularly what were described as specialities. Special trades depended to a large extent on novelties in effects, and the committee reported that "it is imperative that producers of these goods in this country should be fully provided with the greatest possible variety of the necessary materials for their production."

Where the British dye makers had failed to justify these hopes, the committee pointed out, was by entering into arrangements with foreign producers by which the manufacture of this range of dyes had not been attempted, and the user was left to draw his supplies entirely from foreign sources. The gravamen of the colour users' case was that the operation of the Act through a licensing committee did entail very great difficulties to our manufacturers, particularly the textile manufacturers. The Calico Printers' Association and the Colour Users' Association were in favour of allowing the Act to lapse, and the Chambers of Commerce of Blackburn and Preston stated that the Act was a cause of unemployment in the textile industries.

Reasons of the Government

Mr. W. Graham (President of the Board of Trade) said the Government's decision to allow the Act to lapse had not been taken lightly, or until all the circumstances had been very fully explored. It was beyond dispute that the Act originated in the circumstances of the war. It had justified the experiment made thoroughly to establish the industry. There was an actual limitation of time for the operation of the Act. The words "ten years and no longer" were clearly inserted

in the Act. The industry had progressed to a point when it was producing 93 per cent. of the dyestuffs used in this country, and when it felt that a price and quality could be maintained that would compare with the Continental products. There had been a tendency, he went on, to concentrate on the "bread and butter" lines—that was the great bulk lines—and not to pay the same attention to the novelties or specialities or the more particular brands of dyes. That raised an important question when they came to the textile trade. There were important classes of goods which were sold to-day not so much on the quality of the material but on the colour and appearances. Users of dyes had said that there were still certain difficulties in getting access to these special brands and in some cases application was not made because they knew they would have to go to the Licensing Committee.

On the question of national defence, he said that any danger from the service point of view depended on the serious weakening or disappearance of the industry, and he had stated that he did not believe for a moment that the industry was going to suffer. If that were true, the defence position was completely met. A considerable number of university professors had intervened with the plea that if the industry was weakened or disappeared because of the lapsing of the Act they would lose the basis for a great deal of research, for the training of personnel, and for the appointment of personnel after training. He wished to make it perfectly plain that it would be the duty of any Government to see that research was fully safeguarded, either through the Department of Scientific and Industrial Research or in any other way they could devise. Attempts had been made to belittle the arguments that the textile trades had advanced. In order to put the matter beyond doubt he wished to tell the House that they had had a consultation of an informal kind with the Lancashire cotton manufacturers and with representatives of the wool and textile trades in Yorkshire. As a result, there was a unanimous request to the Government that this Act should lapse and that when in fact it had fulfilled its purpose it was unfair that these industries should carry a burden, and that they should have perfectly free access to the dyestuffs they required. The Government could not possibly ignore these representations. The textile industry in Lancashire cotton had everything to gain by the removal of every possible restriction and he had the more confidence in putting that to the House when, believing as he did, there could be no real damage to dyestuff manufacture in this country. To the best of his knowledge, he continued, there was not likely to be any large scale dumping into this country. It was quite impossible to say what steps would be taken by the Government, but he was not satisfied that the danger was real at all, and in any case there was likely to be some form of agreement between the German and British producers which he should imagine would be strong enough to deal with any danger under that head.

Sir John Simon

Sir John Simon (L., Spen Valley) said the late Lord Oxford and Asquith had never voted against the Act, as he was careful to assert it did not raise the abstract question of Free Trade and Protection. He (Sir John Simon) really could not bring himself to believe that there was anything very outrageous in considering whether they had reached the moment when this Act should cease to operate. "My own feeling," he said, "is that really on balance a case has been made out for some continuance of the Act for a time and for a really effective inquiry in the meantime. The worst judgment which could be reached on this subject would be to bring the thing to an end without some properly conducted inquiry to see what the result would be."

Mr. Henry Mond

Mr. Henry Mond (C., East Toxteth) said he was a director of Imperial Chemical Industries, which manufactured 50 per cent. of the output of dyestuffs in this country. A large section of the dyemakers would be perfectly satisfied for their case to rest upon a Governmental inquiry, subject to the temporary continuance of the Act for a year, or whatever time might be decided. The expiration of the Act would not strike a fatal blow to the large corporation in which he was interested, but to the makers of the other half of British dyestuffs it might be fatal.

The price war in dyes was one of the most bitter fights ever waged in the whole history of commerce. In every free country the battle raged. The British textile manufacturer might be forced to take the foreign article to maintain his trade. Instructions given to the German salesmen at present were "Follow British prices unless the Americans start exporting dyes into Great Britain. The moment they do, you will slaughter prices to keep them out." This country was being thrown open as the battle ground for dyes.

"There are in the world," continued Mr. Mond, "some 10,000 known dyes. There are 4,000 in current use, and we make 2,500. It has taken us eight years to build up this industry. It is economically impossible for us to undertake this great range of manufacture of dyes at once. You cannot embark upon the manufacture of the whole range of these special dyes until the necessary men have been properly trained. It cannot be done. Further than that, you cannot get the scientific staff with the knowledge and ability and spread them over this wide range of extraordinary complex subjects. As an example, to carry out the chemical five-year plan in Russia would involve the combined technical staff of Imperial Chemical Industries and Interressen Gemeinschaft. Such a combined staff could not be created in less than 20 years. In the same way you cannot embark upon the manufacture of these specialities except after a considerable period of time."

Mr. T. Shaw

Mr. T. Shaw (Secretary for War) maintained that his statement in 1920 that a great deal of harm would be done to the textile industry had been borne out.

With ten years of Protection the dyestuffs industry employed 423 fewer people than it did in 1920. In 1924 there were proposals for amalgamation between the dye makers in this country and Germany. It was because the Labour Government would not relinquish its holdings that this did not take place. In 1913 Lancashire exported enough goods to wrap round the world sixty-two times, and even last year exported enough to wrap round the world twenty-one times. That was the industry placed against one which was a flea-bite in comparison. In the East he had seen German machines using German dyes to cut us out of the market. People preferred novelties, and it was time we had quick access to the market with the new dyes, "and not leave the market for the German, the Jap, and the Chinaman." The cream of the market had been taken, and we had been left with the skim milk. The Government were going to let the Act lapse in accordance with the promise. For once a political promise would be kept.

The Committee divided on Sir P. Cunliffe-Lister's amendment, and there voted—

For the amendment	225
Against	255
Government majority	30

Manufacture of Rubber Sponges

Firm's Agreement with Chemist

A DISPUTE between Sorbo Rubber Sponge Products, Ltd., and Mr. Ralph Defries, of York Road, Woking, their late works manager and chemist, was before Mr. Justice Clauson, in the Chancery Division on Friday.

Mr. E. J. Macgillivray, for the defendant, said only the counter claim was before his lordship, the action having been discontinued. The company had sought an injunction to restrain the disclosure by the defendant of processes which they said were secret, but which the defendant said were common to the trade. The defendant obtained an order for particulars of the processes which the company said he had divulged. He did not get the particulars, but the action was discontinued. The counter claim was for a declaration that certain clauses in the defendant's service agreement were illegal and in restraint of trade. The clause that was mainly objected to was that for three years after the defendant had left the plaintiff company's employ he should not be concerned directly or indirectly in any business in any part of the world which consisted wholly or in part of the manufacture of rubber sponge.

His lordship said it appeared to him to be most dangerous, without any evidence, to make a pronouncement in general terms as to the validity of a particular clause in an agreement. The court did not see fit to make any order on the counter claim and he thought justice would be done if he directed that each side should pay their own costs.

Generation of Power from Wood Waste

By Oswald Wans, M.Inst.C.E.

An account of the plant which has been evolved for the use of wood waste as a fuel for power generation and heating was given by Mr. Oswald Wans at the Conference of the Institution of Chemical Engineers on the Utilisation of Trade Wastes, held in London on Friday, December 5.

DURING the past twenty-five years much research has been carried out with the object of using wood waste as a fuel for the generation of power and for heating. This has resulted in the building of a large number of generators which have operated with success in most parts of the world. Wood waste has been used as a fuel for steam boilers, but there are practical difficulties in obtaining uniform combustion, and the labour entailed is considerable. Further, the overall thermal efficiency must be low in the size of power plant to which such a scheme would be applicable. The direct burning of wood for this purpose has been extensively applied, but the indications are that the efficiency of a boiler using this fuel does not exceed 60 per cent. and may be appreciably lower; if, therefore, a steam engine efficiency of 12 per cent. is assumed, the net thermal efficiency is only some 7 per cent.

The use of charcoal in a gas generator was a step towards the wood waste plant, but as the process of previously converting the wood into charcoal was effected in some form of kiln, it necessarily involved additional heat losses, labour and cost. Obviously, by burning the wood fuel in a single apparatus in which the production of charcoal and the generation of gas could be effected, these losses would be obviated to a large extent, and this is in essence the dual function of the wood waste gas generator. In round figures, the efficiency of a modern generator and gas engine may be taken as 70 per cent. and 30 per cent. respectively, thus giving an overall efficiency of 21 per cent.

It is this comparatively high overall efficiency which has led to the almost exclusive concentration on this method of generating power from wood fuel, whilst the high generator efficiency favours the economical production of gas for heating purposes.

Chemical Reactions

In practice, the process of gas generation is not difficult, but the chemical reactions are complex, and it is proposed to state briefly only those which affect the design and management of the generator.

If air is passed freely through a bed of incandescent carbon of sufficient depth, the oxygen combines to form carbon monoxide, the nitrogen passing over with the gas as a diluent.

The heat in the carbon monoxide is about 70 per cent. of that liberated by the complete combustion of carbon, the remaining 30 per cent. in the case of a generator being free to raise the furnace temperature. If coal were used, this would cause serious trouble by overheating and the formation of clinker, and is countered in practice by the introduction of steam into the active fire zone, but with wood fuel an endothermal agent is unnecessary, as the moisture and volatile contents suffice to keep the furnace temperature within the working limits of 1,000 to 1,200° C. These simple reactions are considerably modified in practice by the substitution of wood for carbon.

The moisture content of wood varies widely and may be as much as 60 per cent. by weight. The furnace conditions also vary and are to a large extent dependent upon the man in charge, whilst the generation of gas generally takes place more freely than with carbon, due probably to the lower density and porous nature of charcoal. The net calorific value of the air gas produced by the reactions given above is about 120 B.Th.U. per c. ft., whereas that from wood is about 155 B.Th.U. per c. ft., with gas of the following representative composition :—

	Per cent.
CO_2	8·5
CO	26·0
H_2	11·5
CH_4	3·5
N_2	50·5
	100·0

For the present purpose wood may be broadly divided into two classes, namely, hard and soft. To the former belong trees such as oak, beech, ash, elm, birch, and to the latter pine, spruce, fir, larch. The soft woods are resinous and the gas and cleaning plant effluent from them have a more corrosive effect upon the metal walls of the cooling and tar extractor plant. There is little difference in the net calorific values of woods generally, which when dry give between 8,000 and 8,500 B.Th.U. per lb. Under the heading of wood waste is included newly felled timber in pieces of 8 in. to 10 in. in diameter and about 2 ft. long, blocks of about 8 in. cube and less, bark, shavings, chips, sawdust. These are all satisfactory fuels, but the moisture content may be as much as 50 per cent. to 60 per cent. by weight in freshly felled timber and is a factor having an important bearing upon the net calorific value.

Description of Plant

The construction of the generator plant is simple, consisting of a steel plate shell lined with refractory bricks and provided with a grate and cleaning doors at a convenient height from the ground. The lining is contracted immediately above the grate to localise the fire zone and prevent it travelling upwards and burning through. Such a condition favours the generation of CO_2, the burning of the gases at the top of the generator and the overheating of the top plates.

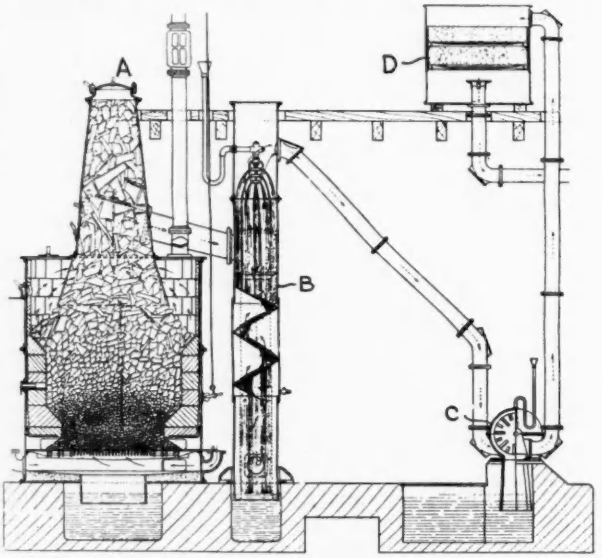


DIAGRAM OF WOOD WASTE GENERATING PLANT, SHOWING GENERATOR (*a*), DUST SCRUBBER (*b*), TAR EXTRACTOR (*c*), AND SAWDUST SCUBBER (*d*).

The gas collects in the annular space around the distributor cone, passes out through large diameter pipes disposed to give a low velocity and, as far as possible, a uniform and easy flow from the fuel bed. The engine suction is generally sufficient to draw off the gas. On leaving the generator, the gas, hot, dusty and tar laden, passes to the dust collector, by which it is cooled and freed from dust, being made to descend two outer tubes and ascend through the water spray in the central tube. The gas still contains most of the tar, and is now drawn through an extractor, in which it traverses four series of blades revolving at about 2,500 r.p.m., and is simultaneously sprayed with cold water. The object here is to bring finely divided water into violent collison with tar particles, and to throw the associated tar and water, which results, on to the extractor casing, whence it drains into the tar settling pit. The efficiency of this process depends largely upon the temperature of the water, which should not exceed 30° C.

The final cleaning is the work of the sawdust scrubber, in which the gas is freed from vapour and traces of tar, by passing through successive trays of sawdust. Coarse sawdust has proved a good filtering medium and is better than wood wool or wood chippings. The total quantity of water required may range according to its temperature from 70 to 100 gals. per 1,000 cu. ft. of gas generated or about 4½ to 6 gals. per b.h.p. hr. developed, and as the weight of tar carried away is about 2 to 3 per cent. of the weight of the wood consumed, it is evident that some steps must be taken for its disposal. The water also contains in solution among other things, alcohols, ammonia and pyroligneous acids, the chief of these being acetic acid. An effluent of this nature must, therefore, not be discharged indiscriminately into rivers, or sewers, being injurious to life and having a pungent smell. Sometimes, particularly abroad, the effluent, after the tar has been removed by a filter tank, flows into a pit, and is allowed to sink into the soil, but generally some means must be employed for neutralising the acid in addition to the removal of the tar.

Uses for the Gas

The gas can be used in any gas engine of good design. Although the calorific value of wood gas is higher than that from coal, it contains less hydrogen, thus permitting of a higher compression pressure, without fear of premature ignition, and establishing conditions favourable to a higher thermal efficiency. The consumption of wood waste per b.h.p. hour depends upon the moisture content, but with an average value of 20 per cent. to 25 per cent. by weight should be about 2·25 lb. per b.h.p. hour with typical sawmill waste. To this should be added the standby losses amounting to 5 to 7 per cent. of the total fuel used, although this figure may be greatly increased if the plant is not closely shut down when not in use.

If the gas is used for heating, the process of generation is similar to that described, and as wood gas is practically free from sulphur compounds, the oxide purifiers necessary for coal or coke gas are not required. The applications are many, and include steam raising, soft metal melting, the heating of ovens, galvanising baths, etc., in fact almost any form of heating in which the temperature is within the range of the gas mixture. In a well-designed furnace a temperature of about 1000° C. is readily obtained and by a system of recuperation higher temperatures are possible.

Cost of Generation

The several factors governing the cost of generation are subject to considerable variation. Let us consider an installation comprising a moderate sized producer, providing in round figures 14,000 cu. ft. of gas of 164 B.T.U. gross per cu. ft. per hour, equivalent to an output of 23 therms per hour.

The cost of fuel delivered on to the feeding platform may have a market value, or the cost of removal may be a source of expense. Assuming that in the present instance the fuel cost 5s. per ton, with a moisture content of 20 per cent., the consumption including standby losses would be about 5 cwt. per hour.

The following cost of generation may be expected for a working year of 2,500 hours :—

	£	s.	d.
Cost of plant complete, including foundations, blower, water pump	750	0	0
Interest on outlay, 8 per cent.	60	0	0
Maintenance, 5 per cent.	37	10	0
Depreciation, 10 per cent.	75	0	0
Total capital charges	172	10	0
One man, 50s. per week, 50 weeks per annum	125	0	0
Additional assistance for cleaning, etc., 4s. per week	10	0	0
Cost of fuel at 5s. per ton	156	0	0
Cost of water at 9d. per 1,000 gals.	4	12	0
Working cost	468	2	0
Cost of power, 7 b.h.p., required to drive extractor and circulating pump at 6d. per hour	62	0	0
Nett total working cost	530	2	0

The total therms developed per annum would be 57,000 and the cost per therm 2¼d., compared with 5d. to 8d. per therm for town gas.

Chairs in Analytical Chemistry

To the Editor of THE CHEMICAL AGE.

SIR,—I was unfortunately unable to hear the paper on "Analytical chemistry" recently read before the London Section of the Society of Chemical Industry by Mr. J. H. Coste. From your report, I notice that Mr. Coste referred to the desirability of establishing Chairs in Analytical Chemistry.

I may, perhaps, be permitted to point out that in a lecture which I delivered before the Chemical Society in March, 1917, I emphasised this aspect of the matter, and indicated that in many of the more important American and Continental Universities such Chairs already existed. In Yale, Virginia, Johns Hopkins, Cornell, and Columbia Universities there were (and probably there still are) Professorships of Analytical Chemistry, and I pointed out that analytical chemistry had its special professorship in Heidelberg, Munich, Leipzig, Würzburg and other German Universities, in the Imperial Technical High Schools of Stuttgart and Vienna, at Upsala, and in most of the Swiss and Belgian and in some of the Italian Universities.

It is clear, therefore, that in many of the world's leading universities the teaching of analytical chemistry is entrusted to specially appointed professors, who take equal academic rank with their other chemical colleagues. The fact that we have in this country special professors to deal with such subjects as physical chemistry, biochemistry, tinctorial chemistry, fuel chemistry, brewing chemistry and metallurgy, makes it all the more strange that analytical chemistry should not have received the same treatment.

I will not take more of your space, but I may perhaps point out that in the above lecture, as well as in one of my presidential addresses to the Society of Public Analysts, and on several other occasions, I have endeavoured to state as clearly as I could, and with as much emphasis as possible, the special claims of analytical chemistry to be regarded as an important special branch of chemical science, and as a most admirable training for the chemical student both intellectually and manually. So large a subject, and one which is in constant process of development, might well, it seems to me, be entrusted to a specially appointed professor, who would have the opportunity of keeping himself fully abreast of the developments of his subject, and who would have the time to deal with it in a manner by no means easy under existing conditions.—Yours, etc.,

A. CHASTON CHAPMAN.

Chemical Laboratories,
8, Duke Street, E.C.3.
December 9, 1930.

Inquest on Glass Silverer

EXPERT medical evidence was called at an inquest at Liverpool on Friday, December 5, into the death of James Carlton (51), a foreman glass silverer at Pilkington's glass works, St. Helens. He was admitted to Liverpool Southern Hospital as suffering from jaundice and died two days later.

Professor W. H. Roberts, city analyst, and Dr. Ellis Ashcroft, lecturer in bacteriology at Liverpool University, who had examined certain organs, said they found no chemical evidence of action by any of the processes in connection with silvering. The appearance of the liver was most unusual, added Professor Roberts, and he had only seen one similar—during the war in the case of a girl who died from T.N.T. poisoning. None of the chemicals used in the silvering process would set up this condition.

A verdict of "death from natural causes" was returned.

New Zealand's Paint Imports

NEW ZEALAND imports of ready-mixed paints during 1927, 1928, and 1929 by countries in quantity and value were :

	1927.		1928.		1929.	
	Cwt.	Value.	Cwt.	Value.	Cwt.	Value.
United Kingdom	25,328	£87,097	24,936	£82,832	23,628	£82,130
United States	7,165	32,375	8,510	39,537	9,763	50,612
Australia	4,834	8,265	1,161	4,250	2,056	7,134
Netherlands	410	4,716	431	4,192	373	3,665
Canada	358	1,726	99	608	164	1,009
Other countries	256	1,194	144	594	332	1,252
Total	38,351	135,373	35,281	132,013	36,316	145,802

Society of Chemical Industry

Group of Research Papers Read to Manchester Section

A number of short papers was read at the meeting of the Manchester section of Chemical Industry, held at the Engineers' Club, Manchester, on Friday, December 5. Dr. R. H. Pickard, F.R.S., presided.

Estimating Minute Traces of Copper

Dr. T. Callan, M.Sc., F.I.C., read a paper entitled: "The Estimation of Minute Traces of Copper." He mentioned that the presence of minute traces of copper had lately received special attention in biological investigations and also in regard to the manufacture of rubber articles. Copper had a very adverse effect in the tendering of fabrics with which rubber was incorporated and the industry had therefore set up a Committee to work out and consider methods for the determination of minute quantities of the metal in rubber goods. A similar problem, he understood, confronted the leather industry.

Dr. Callan stated that the method he had investigated had to do with the reaction of the sodium diethyldithio-carbonate of the copper salt, which was a crystalline substance giving a very deep, intense, brown coloration with traces of copper. This coloration had been found to be strictly proportional to the amount of copper present, and had proved to be an extremely useful quantitative test for traces of the metal of the order of, approximately, one or two parts per million, while even one half part per million could be detected with great ease.

At first it was considered that the mere addition of dithiocarbonate to a copper solution was sufficient for the purposes of the test, but it was later pointed out that there was turbidity, and, certainly after standing for a considerable time, there was a tendency to form turbidity. For the purposes of colorimetric work the addition of a small amount of a protective colloid such as gum arabic was quite sufficient to prevent turbidity. If at any stage of the manufacture of the diethylthiocarbonate it had been passed through a filter paper there was always present sufficient colloidal material dissolved from the paper to obviate cloudiness.

In 1908, Delépine published a paper in which he showed that the dithiocarbonates reacted with a large number of metals and gave coloured compounds, but he merely employed the test qualitatively for nickel, and particularly copper. He certainly did not appreciate that it could be used as a colorimetric method of determination. Therefore, there was some novelty in its application to such a method. It could also be adopted for textile purposes and for the examination of foodstuffs.

Formaldehyde Derivatives and Cellulose

Dr. F. C. Wood, F.I.C., F.T.I., gave an account of the action of formaldehyde and some of its derivatives such as methylene sulphate, chlormethyl acetate, chlordimethyl sulphate, dichlormethyl sulphate and chlormethoxy sulphonic chloride on cellulose and soda cellulose. Eschalier was the first to effect condensation of formaldehyde with cellulose by treatment in an acid solution. This process claimed to increase the dry and wet strength of artificial silk.

In reviewing the literature of the subject Dr. Wood gave an account of new experiments which reconciled recent work with older work and showed that the moisture content, the rate and extent of drying, determined whether a dye resisting or dye absorbing product was obtained. The hyhroxymethyl structure proposed by Samec and Ferjancec for cellulose treated with fairly strong sulphuric acid containing formaldehyde was shown to be untenable for the solid products isolable by short treatments of cellulose with these mixtures.

Finally, the lecturer gave an account of an entirely new reaction, which he thought applicable to perhaps most carbohydrates, in which the methylene group replaces two hydrogen atoms in neighbouring hydroxyl groups. The substances have similar properties to the acetone sugars. While cellulose does not give an acetone derivative, the new reaction applied to it gives monomethylene cellulose, a fibrous substance which is the first stable cellulose derivative to contain only one hydroxyl group. This free hydroxyl group is probably on the number 6 carbon atom on Haworth's model. Oxidation, etherification, and esterification studies on this new ether should give results of fundamental importance.

Some Notes on Viscose Dyeing

Mr. C. M. Whittaker, B.Sc., gave an address upon viscose dyeing. At the commencement of his experience of viscose dyeing he said certain dyers were aware that some dyestuffs gave even dyeing while others did not, but there was no method of selecting dyestuffs except by the method of trial and error. He found that by hanging viscose threads in various dye solutions, in some cases the dyestuff ran a short way up the fibre, while in others it ran up a considerable distance, and there were all sorts of intermediate stages. Those which rose to the least height gave even dyeing on viscose while those which rose to a considerable height gave uneven dyeing. Viscose proved to be a continuous variable, while twist viscose was a still more variable product.

The dyestuffs which rose to very little height were extremely loose to soaping. It was also discovered that those dyestuffs which ran only a little way up the fibre dyed very quickly, while those which ran right up the fibre dyed very slowly.

Therefore, if a blue and a green were mixed, one of which dyed quickly and the other dyed slowly, the result being a blue, in 2½ minutes there was a yellow predominating, and in 15 minutes the blue predominated. Viscose should be entered into the dye bath in a dry condition as it then absorbed more colour than when wet. Mr. Whittaker further stated that viscose should be dyed at the boil.

The "light" and "dark" problem had always to be faced. He had come to the conclusion that every case of light and dark dyeing could be made even in the laboratory though not always in commercial practice. A great deal of light and dark dyeing viscose could be dyed even if the correct amount of caustic was used, but every lot of viscose presented its own problem to be worked out.

Direct cotton colours were extremely curious, because if instead of adding caustic at the beginning of the dyeing it was added in 15 minutes a perfectly even result was obtained. Of course, this was no use from the point of view of commercial practice, because no viscose yarn manufacturer desired to have his yarn dyed in caustic if he could avoid it. Increased depth could be obtained by dyeing with salt, but directly anything like the required depth was obtained then the difference between the two viscoses became more pronounced. A method of dyeing light and dark dyeing viscose perfectly even was to keep on dyeing for 16 or 24 hours. Also, if the dyeing took place at 150° C. under pressure even results could be obtained.

By dyeing viscose with a B-naphthol and common salt solution an even result could be obtained. Mr. Whittaker stated that, in his opinion the direct cotton colours were an extremely complicated class to handle.

A Skin Effect on Viscose Rayon

Mr. J. M. Preston, B.Sc., A.I.C., read a paper upon skin effect with respect to viscose rayon. White markings on viscose yarn gave it the appearance of milkiness owing to the skin cracking away from the interior of the yarn and thus creating an air space which acted as a source for reflecting and refracting light falling upon it. The process was similar to that of real silk breaking down into the constitutents of fibrillæ and causing the white markings which were such a great source of trouble in dyeing operations. He did not, however, suggest that the cause of breakdown was the same in both cases.

A number of lantern slides illustrating the fault in question were exhibited by Mr. Preston. In some cases the slides had been prepared from cross sections examined by means of direct transmitted light and in others by dark ground illumination. In still other cases the examination had been by means of polarised light.

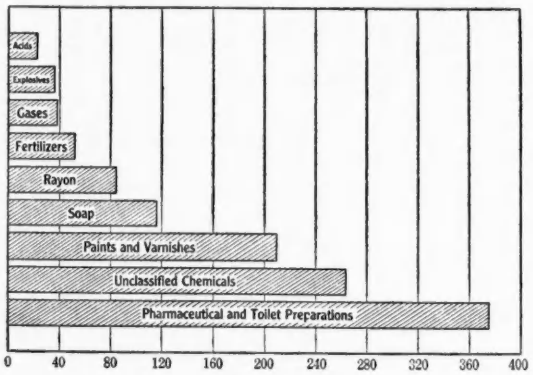
American Chemical Industry During 1930

Relation to General Business Conditions

An account of how the great American chemical industry has fared during 1930 with some interesting comparisons between the production of the chemical and the general industries of the country, is contained in the following review which appears in the current issue of "The Guaranty Survey," the organ of the Guaranty Trust Co. of New York.

So far this year the American chemical industry has not been free from the depression that has gripped industry in general. The demand for chemical products held up rather well during the first quarter, but the full weight of depression, although somewhat delayed, could not be avoided when the chemical-consuming industries further curtailed their operations. During the summer, the chemical markets were dull; but

VALUE ADDED BY MANUFACTURE TO PRODUCTS OF CHEMICAL AND RELATED INDUSTRIES IN 1927, BY GROUPS



as the autumn advanced reports indicated some improvement in demand. On the whole, improvement in recent weeks is considered hardly more than the usual seasonal trend in this industry, although increased ordering in a few individual consuming industries lately has been of such a nature as to suggest some revival, however slight, in these industries. Prominent among these are the glass, soap, paint and textile industries. Prices of chemicals have shown a conformity to the general commodity price movement, with the index of chemical prices prepared by the Department of Labour showing a steady decline since the beginning of the year. The index number for September stood at 90·9, based on the 1926 average as 100, as against 92·1 for the preceding month and 99·9 for the corresponding month last year.

Decline in Exports and Imports

Not only has there been a decrease in the domestic demand for chemicals so far this year, but also the latest foreign trade report indicates that the absorption of American-made chemicals abroad has fallen off perceptibly. During the first nine months of this year the value of exports of chemicals and allied products amounted to $134,632,000, which marks a decrease of 15 per cent. below those a year ago. On the other hand, imports amounted to only $138,940,000, marking a decrease of 20 per cent. below those in the corresponding period last year. However, while there was a distinct recession in both categories of foreign trade, in view of the lower price levels, the actual decreases are exaggerated when expressed in dollar values; and the declines in the volume of both exports and imports were much less than the figures imply. In fact, one-third of the commodities in both the export and import groups actually registered increases in volume above the levels in the corresponding period last year.

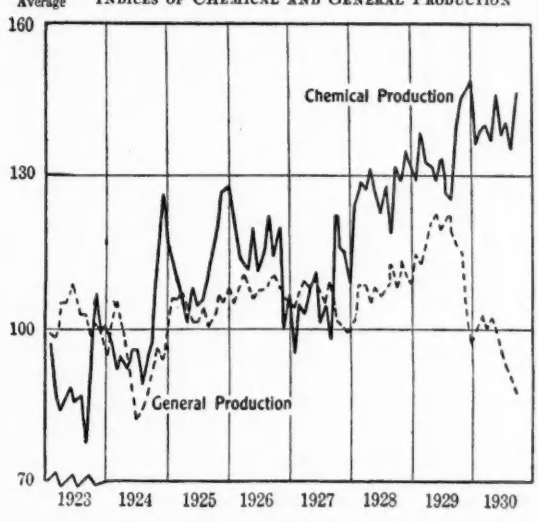
The immediate prospects for improvement in this industry are almost entirely dependent on the course of general industry in the next few months, for the vast diversity in the types of industry that consume chemical products makes the demand for chemicals, which for the most part are producers' and not consumers' goods, very sensitive to the major business movements. Some idea of the scope of this industry, more particularly that part of it involving manufacturing operations, may be gained by reviewing the chart on this page. The general opinion regarding the outlook for the chemical companies in the last quarter of this year is that, inasmuch as output fell off in the last quarter of 1929, the level of production in the last three months of this year should not show so large a decline from that a year ago as was the case in the other three quarters of this year. One estimate anticipates a decrease of 2·2 per cent. in the movement of chemical goods in the last quarter of this year as compared with that a year ago.

Among the chemical consumers that should influence the demand in the near future are the sugar, petroleum and rubber industries. Sugar refining, so far this year, has compared unfavourably with that in recent years, and it is hoped that some improvement in this industry is in order. The consumption of rubber, particularly of rubber tyres, has been low; and should the recent reports of anticipated improvement in this line materialise, some branches of the chemical industry should benefit accordingly. On the other hand, any success resulting from the present efforts to eliminate the overproduced situation in petroleum refining would be reflected in a lessened demand for some chemical products.

Growth of Chemical Industry

At present the United States is the largest producer, consumer and importer of chemical products, and second only to Germany as an exporter. Some idea of the growth of its chemical industry may be gained from a review of the chart comparing the Standard Statistics index of general production, with seasonal movements eliminated, and the index of chemical production based on the consumption of electrical energy by the producers of chemical and allied products. It is interesting to note that the chemical curve, barring wide monthly fluctuations, shows an almost uninterrupted growth since 1923, and that an upward trend has been maintained even during the recent period of general industrial recession. This phenomenon does not indicate, however, that the total value of all chemical products has not declined in conformity with general industrial recession. Since the producers of highly processed chemicals consume more electrical energy than those of less refined products, the upward trend of this curve indi-

Per Cent of 1923-5 Average — INDICES OF CHEMICAL AND GENERAL PRODUCTION



cates not a complete defiance of total chemical production to general industrial levels, but rather the continuous growth that has been taking place in this branch of the industry.

Prior to 1914 the United States was a large importer of chemicals, and was almost entirely dependent on foreign sources for highly processed materials. The rapid development that has taken place since that year, stimulated mostly

by the difficulty of obtaining chemical products from abroad during the war, reached what might be called a climax in 1929, when production, exports and imports reached record proportions. Inasmuch as only 8 per cent. of the total domestic chemical production is dependent on export markets, the demand from American industry as a whole in normal times could almost absorb the present chemical plant capacity; and with the assurance of industrial progress in the future, permitting a gradual expansion of chemical plant capacity, there is little likelihood that the American chemical industry will lose any of the ground that has been gained since 1914.

Beyond this point, however, further expansion must depend on the development of foreign markets; and, to judge by conditions as they appear at present, the American producers are apt to meet vigorous competition abroad. The chemical industry of Germany has been restored to its pre-war basis, while the chemical industries of France and England, which were developed during the war, must be considered. However, the American producers, with no attempt to minimise the resistance that they are bound to meet in further developing markets abroad, feel that with the tendency toward centralisation in the American industry, more efficient production, and more aggressive marketing, foreign competition will be met with a reasonable measure of success.

The Science of Dust Removal

Basic Principles for Boiler and Furnace Operation

DURING the past few years an enormous advance has been made in the technique of dust removal from air and other gases, a subject of particular interest to the chemical and allied industries. One of the most important fields is dust removal from chimney gases, and the enormous volumes concerned have constituted a formidable problem. Thus, for example, a super-power station burning 1,000 tons of coal per 24 hours evaporates 22,400,000 lb. of water to steam and discharges in round figures 500,000,000 cubic feet of chimney gases, at, say, 250°/350° F., in this time.

Centrifugal Gravity Principle

However, the problems have now been solved, and a few years ago, after extensive laboratory and large-scale research work, Davidson and Co., Ltd., of Belfast, placed on the market their patent dust collector operating on the centrifugal gravity principle, which is essentially a circular casing of volute shape, into which the dust-laden gases pass tangentially at a high speed. As a result of a practical experience already represented by over 500 collectors in operation for boiler plant alone, equivalent to the separation of about 150,000 tons of dust per annum, the efficiency is such that 70 to 95 per cent. of the dust is collected according to circumstances, and irrespective of the dust concentration in the gases. Thus, individual power plants are recovering 20 to 30 tons of dust per 24 hours or over, both from mechanical stoker and pulverised fuel fired plants, and anything from 0·65 to 15·00 per cent. on the weight of the coal is found to be leaving the combustion chamber.

Difficulties of other Systems

Various other methods are, of course, theoretically possible for the separation of dust from chimney gases and have been investigated in the most detailed fashion. For example, mere reduction in the velocity of the gases to allow the particles to separate by gravity is a hopeless proposition, because of the enormous size of the equipment necessary. Also electrostatic precipitation is much too expensive, apart from the complicated question of efficiency with varying dust content, whilst simple washing by water sprays in a high tower for dust removal (as apart from sulphur dioxide and sulphur trioxide) has the same serious disadvantages of size of equipment and capital cost. A possibility also is filtration of the gases through bags, but practical experience in this field with blast furnace gases is not encouraging, if only because of the heat, necessitating the use of asbestos, for example.

Centrifugal separating, however, on scientific lines has proved, as indicated, to be remarkably successful at reasonable capital cost, with only very small increase of power, as well as simplicity of operation and installation, whilst the same principles are now being adopted for the separation of dust in all kinds of industries, about 400 of such collectors being at work.

Electroplaters' Technical Society

A Satisfactory Year's Work

IN his report presented at the annual meeting of the Electroplaters' and Depositors' Technical Society in London, Mr. S. Wernick (hon. secretary) stated that although the year had not been a happy one industrially, the electrodeposition industry had probably not suffered as much as most others. This was due to the fact that electrodeposition entered into so many industries, and also to the technical developments of recent years, in which the Society had played an important part. During industrial depression, one of the first effects was usually a setback to research and technical bodies, at the very time when the aid of such bodies could be most profitably utilised. He was, therefore, glad to report that so far as that Society was concerned, not only has there been no retrograde step, but steady progress has continued in every direction, and one or two ambitious experiments tried during the Session had proved to be remarkably successful.

Membership had steadily increased, the number of applications received and passed being 69. Nine members resigned, while death, unfortunately, claimed two—Mr. W. James and Mr. M. Hirons. The total gain in membership for the session, therefore, amounted to 58. The attendance at meetings had been satisfactory. During the session, ten ordinary meetings and one special meeting were held, and eleven papers were presented. Two of the meetings were entirely devoted to open discussions. In preparing the sessional programme of papers, it was the committee's aim to touch on as many aspects of electrodeposition as possible, and the papers presented last session dealt with the deposition of copper, nickel, zinc, cadmium, chromium, silver and gold on base metals varying from iron to aluminium and its alloys. Discussion of these papers allowed of the introduction of any special phases of these subjects in which members were particularly interested.

Volume 5 of the Journal had not fallen behind its predecessor in point of the quantity or quality of the matter published. The Journal was assuming more imposing proportions, and the interest taken in it in countries abroad was particularly gratifying. The abstracting service represented by the Literature List had been maintained, and had kept members well informed of electrodeposition activities outside the Society.

The exhibition held on January 31 was unique as a society function, and represented the first exhibition of its kind ever held in this country. It proved an overwhelming success, the enthusiastic co-operation of exhibitors (some 20 odd firms and individuals) who participated, being well rewarded by the interest which the exhibition aroused. At the last annual meeting, the suggestion was made that closer co-operation with the American Electroplaters' Society and the American Electrochemical Society was desirable. This has been established, although they had, of course, always been on a friendly footing with these societies, and apprised each other of developments as they occurred.

Rates of Solution of Small Particles of Gypsum and Anhydrite

IN connection with a study of the utilisation of anhydrite for the retardation of Portland cement, the Nonmetallic Minerals Experiment Station of the U.S. Bureau of Mines at Rutgers University, New Brunswick, N.J., has determined the rates of solution of very finely divided gypsum and anyhdrite. For particles of both these materials above 35 microns in size (one micron = 1/25,000 of an inch) the specific dissolution factor (rate of solution per unit surface of material of a given particle size divided by the rate per unit surface for particles larger than 35 microns) is unity. For gypsum the specific dissolution factor increases with decreasing particle size until a maximum of 3·9 is reached at 15 microns, whereas for anhydrite a maximum of 17·8 is reached at 1·5 microns. Below 15 microns the specific dissolution factor for gypsum drops rapidly, reaching the extraordinarily low value of 0·08 for a three-micron particle and of 0·03 for a one-micron particle. This is to be contrasted with a value of 16 for a one-micron particle of anhydrite. Thus very finely ground anhydrite tends to dissolve relatively rapidly, but very finely ground gypsum relatively slowly. The details of these experiments will be published in the near future.

Society of Public Analysts

Scientific Meeting and Elections

AN ordinary meeting of the Society of Public Analysts was held at the Chemical Society's Rooms, Burlington House, London, on Wednesday, December 3, the President, Dr. J. T. Dunn, in the chair.

A paper on "Storage and Delivery Apparatus for Antimony Chloride Solution and other Corrosive Reagents," by G. Middleton, B.Sc., A.I.C., described an apparatus in which the antimany chloride solution is forced upwards by means of a compression rubber bulb into a tube fitted inside the reagent bottle, whence it passes into an external measuring tube, delivering 2 c.c. into the tintometer cell. The ground-glass joints connecting the parts of the apparatus are constructed in such a manner that the reagent does not come in contact with them, thus preventing their being cemented together by the formation of antimony oxychloride.

"Tests for Impurities in Ether. Parts II and III," by G. Middleton, B.Sc., A.I.C. and F. C. Hymas, B.Sc., A.I.C., gave a comparison of the sensitiveness of tests for acetaldehyde and acetone. The colour developed with Schiff's reagent, even with the purest ether, is due to rapid oxidation of the ether during the period of the test—this reaction being catalysed by sulphur dioxide. The addition of 0·1 per cent. of pyrogallol to the reagent prevents this, while it does not interfere with the sensitiveness of the reagent towards acetaldehyde. The caustic alkali test should be superseded by a more delicate test. Nessler's reagent is a sensitive test for small quantities of acetone, but fails to indicate the presence of larger quantities. The tests recommended for official adoption are: For acetaldehyde the modified Schiff's reagent; and for acetone, the vanillin test of the Dutch Pharmacopœia.

A third paper on "The Determination of small Quantities of Calcium in Magnesium Salts" was by Norman Evers, B.Sc., F.I.C. Owing to the unsatisfactory and lengthy nature of the usual methods for determining small amounts of calcium in magnesium salts, more particularly in the oxide and carbonate, the following process was suggested: Dissolve the required weight of the magnesium salt in 25 c.c. of 20 per cent. sulphuric acid, and add 50 c.c. of 95 per cent. (by vol.) alcohol. Mix thoroughly and leave overnight. Filter on a Gooch crucible and wash with 200 c.c. of a mixture of 2 volumes of 95 per cent. alcohol and 1 volume of 20 per cent. sulphuric acid. Ignite and weigh as $CaSO_4$. The results obtained have a tendency to be slightly low, but are sufficiently accurate for ordinary purposes. The method may also be applied to solutions containing phosphates, iron, etc.

"A New Method for the Detection of Nitro-Group in Organic Compounds," by P. K. Bose, D.Sc., is applicable to all poly-nitro organic compounds, and is based on the hydrolytic dissociation of the compound by means of potassium hydroxide, and the identification of the resulting nitrous acid by means of the Griess-Ilosvay reagent.

Certificates and Elections

Certificates were read for the first time in favour of:—Kenneth Bullock, M.Sc., Ph.D. and Frederick Cecil Hymas, B.Sc., A.I.C. Certificates were read for the second time in favour of:—Arthur Nicholls Ainsworth, B.Sc., Bertram Arthur Gough, William Henry Gough, M.Sc., A.I.C., and William Henry Shilling, B.Sc., A.I.C.

The following were elected members of the Society:—Leonard Balmforth, B.Sc., F.I.C., Reginald Joseph Cole, B.Sc., Violet Dorothy Dudman, B.Sc., A.I.C., Frank George Edmed, O.B.E., B.Sc., A.R.C.Sc., F.I.C., Roy Gardner, D.Sc., F.I.C., William Victor Griffiths, B.Sc., A.I.C., Daoud Younis Haddad, B.Ph., Percy George Terry Hand, F.I.C., Magnus Herd, B.Sc., A.R.T.C., F.I.C., Gilbert Underwood Houghton, B.Sc., A.I.C., Archibald Robert Jamieson, B.Sc., F.I.C., William Jefferys Lesley, M.Sc., Ph.D., A.I.C., Allison Reginald Murray MacLean, B.A., M.Sc., Ph.D., Frederick Henry Newington, F.I.C., Colin Paterson, B.Sc., A.I.C.

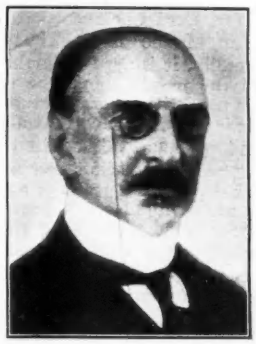
Visit to Industrial Gas Factory

STUDENTS from the Liverpool Central Technical School on Saturday paid a visit to the model factory opened in August by British Industrial Gases, Ltd., at 57-63, Warwick Street, Liverpool, for the manufacture of oxygen. The factory embraces the local headquarters of a welding service, comprising the delivery of oxygen, dissolved acetylene, "Abcar" carbide, and all other requirements for oxy-acetylene welding.

The Late M. Henry Gall

Loss to French Chemical Industry

BY the death of M. Henry Gall, president of the Société de Chimie Industrielle, France has lost a prominent figure in her chemical industry and one of the pioneers of industrial electro-chemistry. As the result of his researches with M. de Montlaur between 1886 and 1889 electrolytic preparation of chlorate of potash from a solution of potassium chloride was established and was the first industrial application in France of electric current to preparation of a chemical product. In 1889 he formed the Société d'Electrochimie to exploit the process by means of electricity obtained from water power. Its range of manufactures has since been extended to include calcium carbide, cyanamide, sodium, calcium, magnesium, sodium peroxide and cryolite for the preparation of aluminium, a metal included in the products of the Société d'Electrochimie almost from the start.



Under M. Gall's direction the undertaking grew steadily by the absorption of the Société des Carbures Metalliques, founded in the early days of the carbide industry, and later of the Société des Aciéries d'Ugine and has some fifteen factories in various parts of France. M. Gall was not only a notable business administrator and chemist, he had outstanding personal qualities, and was a popular figure in several French scientific societies.

European Consumption of Calcium Nitrate

A PHENOMENAL growth in European consumption of calcium nitrate has occurred during recent years. A French authority has estimated that Germany, with a cultivated area slightly less than France, uses more than 400,000 tons annually, representing about 15 per cent. of the entire German nitrogen consumption. Denmark, one-twelfth the size of France, uses 140,000 tons of calcium nitrate, in addition to 50,000 tons ammonium sulphate and 40,000 tons of sodium nitrate. In the Netherlands, consumption of calcium nitrate has grown in five years from 4,000 tons to 70,000. This relatively small country also uses about 135,000 tons of ammonium sulphate and 145,000 tons of sodium nitrate.

French agriculturists used about 60,000 tons of calcium nitrate in the last season, which corresponds approximately with the production capacity of the three producing establishments. In order to stimulate French consumption, reports the U.S. Assistant Trade Commissioner in Paris, producers recently organised an information and educational bureau at Paris called "Bureau de Renseignements et de Propaganda pour le Nitrate de Chaux en France."

Scientific Research in Rubber Industry

THE object of the Rubber Industry Bill, the text of which was issued on Wednesday, is stated in the memorandum attached to the Bill to be the continuance and development of scientific and industrial research into the problems arising in the manufacture of rubber, and to place the Research Association of British Rubber Manufacturers upon a sound basis. The Association, established in 1920, has been supported by voluntary contributions from manufacturers and by grants made by the Department of Scientific and Industrial Research from the £1,000,000 fund provided by Parliament in 1917 for the encouragement of co-operative industrial research.

The proposals in the Bill involve the payment of a contribution by all rubber manufacturers in the United Kingdom and Northern Ireland of a sum not exceeding one twenty-fifth of a penny per pound in respect of all rubber used in their processes of manufacture, either as such or in the form of latex. The operation of the Bill is limited to five years and the contributions to an average sum of £15,000 per annum.

The British Industries Fair

Need for Permanent Buildings and More Publicity

THE British Industries Fair should be developed so as to become a truly national manifestation of the quality and range of British products and an increasingly powerful factor in the expansion of trade, is the chief recommendation contained in the Report of the Committee under the chairmanship of Lord Chelmsford, which has been inquiring into the future of the Fair. The Government and manufacturers generally, it is urged, should accord it more vigorous support and the public should be encouraged to learn through the Fair the British manufacturers that can supply their needs.

It is recommended that a site easily accessible from Central London should be acquired for permanent buildings for the Fair, and that the Government should establish a regular annual publicity grant of a minimum of £100,000 (instead of £25,000 granted for a year at a time as at present). The Government, recognising the Fair as an integral feature of our economic policy, should back up more vigorously, on a scale not incommensurate with the support accorded to the Empire Marketing Board, the enthusiastic individual efforts which have brought the Fair to its present strength. The Committee received overwhelming evidence that £25,000 was totally inadequate for effective publicity for the Fair throughout the world, and it expresses entire agreement with the view that the advertisment of the Fair abroad is of value to British industry generally and not merely to exhibitors.

The "Exhibition Mind"

In remarking that the Fair is still far from being fully representative of British industry, the Committee expresses the view that abstention of trades other than those which promote exhibitions of their own is attributable to psychological reasons such as lack of the "exhibition mind" among manufacturers who spend liberally on other forms of publicity, but doubt the value of exhibitions and, in certain industries, fear piracy of their patterns. "Our foreign competitors are more enterprising and longer-sighted in such matters," the Committee states.

At present the Fair opens in London and Birmingham on the third Monday in February each year (February 16 in 1931) and closes on the Friday of the following week. No alteration is recommended, except that the Fair should remain open on the Saturday of the second week. The public is admitted to the Birmingham section all day, and the Committee recommends that the London section, hitherto open to the public only in the evenings and Saturday afternoon, should in future be open to the public on payment from 2 p.m. each day and all day on both Saturdays.

Hofmann's Prediction in 1862

Contrast with Dyestuffs Position Before the War

SOME interesting points in modern dyestuffs history were recalled in a lecture entitled "Man the Inventor in Chemistry," by Professor John Read, of the Chemistry Department, United College, University of St. Andrews, at the Higher Grade School, Tayport, last week. He stated that in 1862 Professor A. W. Hofmann, predicted that "England will, beyond question, at no distant day, become the greatest colour-producing country in the world." In 1913 synthetic dyes to the annual value of some £20,000,000 were indeed being produced—mainly, however, in Germany. The Germans were actually making synthetic indigo (formerly grown in India) for dyeing British Naval uniforms, and synthetic alizarin (formerly grown in France) for dyeing French military uniforms! Six British dyestuff factories could muster only 35 chemists all told, while one large German concern had 307 expert chemists and 74 technologists.

During the war it was at last generally realised that no modern first-rate nation can afford to depend upon outside sources for its dyes and fine chemicals. Accordingly the Dyestuffs Act was put into force. Under the shelter of this Act, Great Britain had made admirable progress during the last ten years in building up a successful dyestuffs industry, with its delicately co-ordinated network of associated industries. Chemists and chemical technologists all over the country were at one in deploring the threatened lapse of the Dyestuffs Act and in striving to avert what they regard as a serious menace to one of the most vital activities of the nation.

"Account Rendered"

Press Opinions on Sir Ernest Benn's Book

THE following are selected from the numerous Press notices of Sir Ernest Benn's recent book, "Account Rendered."

"Sir Ernest Benn calls for a powerful lead . . . to bring the nation back to a true sense of economy."—*The Edinburgh Evening Dispatch.*

"Lively and devastating."—*Aberdeen Press and Journal.*

"Of the gravest importance to all who would restore Great Britain to economic health."—*The Daily Mail.*

"He performs a task of great potential value in the simplifying of economics for the plain man."—*Birmingham Gazette.*

"Brimful of wit and satire."—*The Morning Post.*

"The book has certainly appeared not a moment too soon. . . He does not mince his language. . . . We hope we have said sufficient to cause readers of *The Banker's Magazine* to be anxious to peruse it. There is not a dull page in the volume."—*The Banker's Magazine.*

"Earnest and spirited."—*The Daily Telegraph.*

"This book makes you think—even gasp."—*The Daily Dispatch.*

"A book which will stand as a milestone in the financial history of Great Britain, a book which no citizen of these islands can afford to leave unread."—*The Sunday Times.*

"Perhaps, the most valuable addition which has been made to financial literature for a considerable period."—*The Spectator.*

"Sir Ernest Benn shares with W. E. Gladstone the unusual gift of making figures as interesting to us as fiction."—*The Bristol Times and Mirror.*

"Definitely a book that should be read."—*The Financial Times.*

"This short and lucid book is one which every person of intelligence should read."—Mr. St. John Ervine, in *Time and Tide.*

"A valuable and suggestive work . . . contains many incisive criticisms, is devoid of technicalities, and the ordinary reader will derive much information and instruction from it."—*The Times,* in "City Notes."

Power from Sludge Gas

Success of Birmingham Plant

BIRMINGHAM TAME AND REA DRAINAGE BOARD (which is responsible for dealing with the sewage of a large and populous area in and around that city) in a report to the City Council, state that the sludge gas power plant has been eminently successful. The results obtained are greater than anticipated. A third gas engine has been installed, thus making the power unit the largest of its kind in the world. Many engineers and industrial chemists from the colonies and foreign countries have, the Drainage Board states, been among the visitors.

The provision of the first portion of the plant was authorised in 1926, at a cost of £12,515, and in 1928 an extension was made at a cost of £18,000. Gas engines of 150 b.h.p. and 100 b.h.p. respectively were installed at the Saltley Power Station, and the necessary reinforced concrete containers, which float upon the surface of the tanks and in which the gas is collected, were constructed.

At this stage it was anticipated that the production of 1½ million units of electricity per annum would be effected with an annual saving to the Board of more than £2,000 when compared with the Birmingham Corporation tariff for electricity, but the experience of the past two years working has proved that it will be possible with the gas collectors provided to obtain an annual output sufficient to generate 2 million units, with a largely increased saving after allowing for the interest and repayment of all loans. As the Board's consumption of current will shortly reach 3 million units per annum it has been felt desirable to lay down a third gas engine (of 400 b.h.p.) and alternator, and this has accordingly been done.

Thus there are now installed at the Sewage Power House three gas engines (with a total capacity of 950 b.h.p.), all operated by sludge gas.

Protection of Metal by Painting

Advantage of Painting in the Afternoon

A LECTURE on "Protection of Metal by Painting" was delivered by Mr. Ulick R. Evans, of Cambridge University, before the Liverpool section of the Society of Chemical Industry, on Friday, December 5. The rusting of iron, he said, was not a direct oxidisation process; indeed, the invisible oxide film produced by the direct action of air on stainless steel protected it against corrosion. On ordinary steel the corresponding invisible film gave no protection unless an oxidising agent was present to repair the skin as soon as a breakdown occurred. The addition of potassium chromate to cooling water to preserve the steel jackets, and the use of red lead or lead chromate in paints, were examples quoted.

In the absence of such substances, steel suffered corrosion when wetted. Electric currents passed between the anodic places, where the skin was in bad repair, and the cathodic places, where it was in good repair. Most paint vehicles, whether linseed oil or nitro-cellulose, absorbed some water, and unless the lowest coat included some anti-corrosive substance, attack would occur when the painted steel iron or steel was wetted. The oil-vehicle was the most unstable part of a paint coat, and should be reduced to a minimum.

At Cambridge and other places they had demonstrated that paint applied in the afternoon lasted far better than painting done at sunrise, which had shut in an invisible moisture film usually present early in the day. The conditions of paint required in different places varied so much that paint manufacturers' salesmen should be chemists. Salt, if shut in under paint, as at a seaside place, would draw in water and cause rapid failure.

Steel in Concrete Buildings

A member of the audience raised the question of steel in concrete buildings, and pointed out that at present the steel of many buildings was only protected by concrete, which was porous.

Mr. Evans replied that the alkali content of concrete had been very carefully studied in America during the demolition of skyscrapers. Where there was chloride present the chloride interfered with the action of the alkali. The chloride ions could penetrate the protective oxide film, and there was very serious corrosion. The volume of the rust produced could cause the concrete to crack. It was particularly bad when you got stray electric currents from tramways and so on. Stray electric currents were a very serious problem.

The Buenos Aires Exhibition

THE following firms are included in the second list, just issued, of intending exhibitors at the British Empire Exhibition at Buenos Ayres in February next: Allen and Hanbury, Ltd., Babcock and Wilcox, Ltd., Bakelite, Ltd., Baker Perkins, Ltd., British Metallic Packing Co., Ltd., Thos. Broadbent and Sons, Ltd., W. J. Bush and Co., Ltd., Cambridge Instrument Co., Ltd., Chance Brothers and Co., Ltd., Doulton and Co., Ltd., Filtrators, Ltd., Thos. Firth and Sons, Ltd., T. B. Ford, Ltd., Furmoto Chemical Co., Ltd., Imperial Chemical Industries, Ltd., Lawes Chemical Co., Ltd., Mather and Platt, Ltd., Herbert Morris, Ltd., "Sentinel" Wagon Works, Ltd., Siebe, Gorman and Co., Ltd., Staveley Coal and Iron Co., Ltd., and the Sturtevant Engineering Co., Ltd.

Imported Fertilisers and Feeding Stuffs

THE Standing Committee of the Board of Trade recommends under the Merchandise Marks Act, an Order in Council requiring imported fertilisers and feeding stuffs of the following descriptions to bear an indication of origin:—(*a*) Bone meal and bone flour, whether raw, degreased or degelatinised. (*b*) Hoof meal, horn meal and mixtures thereof. (*c*) Meat meal, meat and bone meal, and carcass meal. (*d*) Dried blood, whether ground or unground.

The mark should be affixed to the container and the Order in Council should apply on importation, and on sale, or exposure for sale, wholesale and retail. Sales of 14 lb. or less should be exempt, and the order should come into force three months after it is made.

Chemical Matters in Parliament

The Dyestuffs Act

MR. WISE (House of Commons, December 7) asked the President of the Board of Trade the number of cases in each of the last 10 years in which the Colour Users' Association had taken formal exception on price grounds to decisions of the Dyestuffs Advisory Licensing Committee refusing applications for import licences.

Mr. W. Graham: I cannot find that there has been such a case. The colour users are, of course, fully represented upon the committee itself, and, presumably, if the price were unsatisfactory, the import licence would be granted.

Sir. H. Gratton-Doyle (December 4) asked the Secretary of State for War whether, in view of the use of chemical dyes in connection with the manufacture of explosives, he had called for an opinion from the technical officers of his Department as to the position which will be created by the lapsing of the Dyestuffs Act.

Mr. Shaw: I can assure the hon. member that this aspect of the matter was not lost sight of when the decision of His Majesty's Government was arrived at.

Dead Sea Salts Concessions

Asked by Lt.-Col. C. K. Howard-Bury (House of Commons, December 8) whether he could state what was the present position of the conversations with the French Government with regard to the Dead Sea concessions which were given to Mr. Moses Novamesky, and whether the question had now been brought before The Hague tribunal, Mr. Henderson, the Foreign Secretary, replied that the Government had informed the French Government that they were willing, subject to certain conditions, to refer the question to arbitration. Correspondence with the French Government had been proceeding, but he was unable at that stage to give further details.

Chemical Warfare

Mr. Graham White (House of Commons, December 8) asked the Secretary of State for Foreign Affairs whether, in view of the cost to the taxpayer of experiments for defence against chemical warfare, he would consider whether arrangements could be concluded with other countries which, like ourselves, had renounced the use of gas as an offensive weapon for the pooling of information and of expenditure upon anti-gas research.

Mr. A. Henderson: I fear that the adoption of this proposal would not be practicable at present.

In reply to Mr. R. S. Young (House of Commons, December 9), Mr. Shaw gave the following figures of the total number of staff on the approved establishment of the Chemical Warfare Research Department on April 1 of each year: 1920, 410; 1925, 480; 1929, 535; 1930, 553. The 1920 figure is exclusive of the Sutton Oak establishment. Five hundred and thirteen animals were used at Porton and Cambridge for gas experiments in 1929, and all experiments were carried out in strict conformity with the terms of the licences held by the research workers, excluding any possibility of inflicting unnecessary suffering.

Imports of Soap from Russia

Mr. W. Graham announced (House of Commons, December 9) that during the 12 months ended October 31, 1930, the total imports of soap into Great Britain and Northern Ireland registered as consigned from the Soviet Union (Russia) amounted to 24,043 cwt., of a declared value of £33,470.

Oil Fuel Tests

Mr. G. H. Hall (Civil Lord of the Admiralty), replying to Lieut.-Commander Kenworthy (House of Commons, December 10) said creosote oil mixed with petroleum oil had been in use in the Royal Navy for several years. Three 20-ton samples of oil fuel produced by the low-temperature carbonisation of coal had been burnt experimentally by naval type boilers at the Admiralty fuel experimental station at Haslar. The results, which were generally satisfactory, were being communicated to the producers. Two further samples were on order, and it was proposed to carry out further trials with these oils in a destroyer in the near future. In addition, trials had been carried out at the Admiralty Engineering Laboratory, West Drayton, with Diesel fuel oil produced by hydrogenation. Shale oil was useful to a small extent for special purposes.

From Week to Week

RECENT WILLS include Mr. Walter Preston, chairman of Walter Preston, Ltd., manufacturing chemists, Leeds (net personalty £18,574) £37,423.

THE LIBRARY of the Chemical Society will be closed for the Christmas holidays from 1 p.m. on Tuesday, December 23, until 10 a.m. on Monday, December 29.

PRELIMINARY FIGURES of United Kingdom trade for last month show imports valued at £79·4 million and exports valued at £44·1 million, as compared with £108·2 million and £63·1 million respectively in November, 1929.

PRESIDING at the annual meeting of the Viking Whaling Co., Ltd., in London on Wednesday, Mr. Johan Rasmussen said that whale oil was at present being produced in excess of demand. There seemed no other way than to curtail production considerably and negotiations between whaling companies interested were now in progress.

MR. RAYMOND R. BUTLER, M.Sc., head of the Department of Chemistry at Plymouth Technical College, has been appointed principal of Aston Technical College, Birmingham. The Plymouth Education Committee is inviting applications for the post about to be vacated by Mr. Butler, the salary attached to which is £275, rising to £494 per annum.

THE ANNUAL DINNER, dance and cabaret of the Manchester and District Section of the Institute of Chemistry, held at the Manchester, Ltd. Restaurant on Thursday, December 4, was attended by nearly 300 members and guests, with Mr. R. B. Pilcher, Registrar, and Prof. Lowry as chief guests. Mr. W. D. Rogers, chairman of the Manchester and District Section, occupied the chair.

THE NATIONAL UNION OF MANUFACTURERS have sent to the President of the Board of Trade a resolution deprecating the decision of the Government not to renew the Dyestuffs Act. German and other continental manufacturers, it was stated, were preparing to embark on extensive importation not only of the dyes but also of ink pads and marking devices, in anticipation of the withdrawal of the protection which had hitherto been afforded to the British products.

A CONFIDENTIAL MEMORANDUM on the market for building material in Iraq has been prepared in the Department of Overseas Trade from information furnished by H.M. Consul at Basra. Firms desirous of receiving a copy should communicate with the Department at 35, Old Queen Street, London, quoting reference number C.X. 3,410. A similar report on the market for disinfectants, insecticides and animal dressing in Holland has been prepared from a report by the Consul-General at Rotterdam and may be obtained on quoting reference number B.X. 6,901.

THE BOARD OF TRADE announce that they have referred to the Standing Committee an application for an Order in Council to require the marking with an indication of origin of imported slider fasteners of the type commonly known as Zipp or Lightning fasteners, *i.e.*, consisting of two flexible stringers comprising a series of metal members which are progressively locked or unlocked by the action of a slider. Representatives of any interests substantially affected by the application who desire to be heard in opposition at the public inquiry which will be held later by the Committee, should communicate with the Secretary, Mr. E. W. Reardon, at the Board of Trade Offices, Great George Street, London, S.W.1, as early as possible and in any case not later than January 10, 1931.

THE ANNUAL REPORT of the Science Museum, South Kensington, issued by the Board of Education, records the visit in 1929 of 1,061,754 members of the public, an increase of 161,700 over the figures for 1928. In August, 1929, the monthly total reached the record number of 144,655, while the total number for the first six months of the present year has been 100,000 above that of 1929. The Advisory Committee comment gratefully upon the support received in the form of gifts and loans, which have totalled 1,150, apart from three exhibitions. Willingness to offer objects of historical worth and interest to the Museum maintains the collections, it is observed, at a trifling cost to the State. The need for the centre block of new buildings is described as urgent, since it is space which is lacking to show current practice in the various collections of the Museum, rather than willingness to lend.

THE employees of Castlebank Dyeworks, Anniesland, Glasgow, have contributed £95 2s. during the year to infirmaries and charities.

MAY AND BAKER, LTD., manufacturing chemists, of Battersea, London, announce reductions of 10s. per cwt. in the price of sodium tartrate and potassium B.P., and 7s. 6d. per cwt. in the price of seidlitz powder B.P.

THE KAISERODA works of the German Wintershall potash concern are reported to be increasing their daily production of salt cake from 500 to 600 tons. At present the Kaiseroda accounts for about half the German output of salt cake, and is the leading refiner of potash.

PREPARATIONS for the erection of a large Russian superphosphate factory on the right bank of the Neva at Leningrad have been going on for some time. The output is expected to be 400,000 tons per year, and the estimated cost for the installation will be about 32,000,000 roubles.

A FORTY THOUSAND ACRE estate in North Auckland has been purchased by a New Zealand company for the production of tung oil on a large scale, announces Mr. R. G. Hatton, who has been making an extensive tour of the fruit-growing areas of New Zealand on behalf of the Imperial Board of Fruit Production.

THE FINANCING of the recently arranged £72,000,000 Chilean Nitrate Consolidation Plan will be discussed, it is learned, at a series of conferences in New York next week, in which the participants will, it is understood, be the National City Bank, the Anglo-South American Bank, Guggenheim Brothers, and the Ryan and other interests.

NEW PETROLEUM REFINERIES have just been opened at Santa Cruz de Teneriffe (Canary Islands), with a present capacity of 5,000 barrels daily. Several shipping lines have indicated their intention of refuelling at this installation. The refinery, which is owned by the Compañia Española de Petroleos, covers an area of 2,150,000 square feet and is connected with the loading wharf by a pipe line three miles long.

THE PRINCIPAL OBJECT of the patent system was to improve trade, said Mr. Eric Potter in the course of a lecture to the Nottingham Section of the Society of Chemical Industry on Thursday, December 4. There was no manufacture of any sort or any kind which in its present state was not the result entirely of invention. To stimulate inventive faculty and so promote improvement was a matter of policy with every trading nation, and was fundamentally essential to a leading nation.

SOVIET RUSSIA, according to a United States report, is making a strong bid to secure the Argentine alkali trade. It is estimated that Argentine imports of caustic soda from Soviet Russia for the first nine months of 1930 were 3,000 metric tons. Trade reports indicate that Russia expects to supply at least half of the Argentine requirements of caustic soda during 1931. Besides exceptionally low prices for Soviet alkalies there is an arrangement to take quebracho, hides, and other Argentine products in exchange.

THE I.G. FARBENINDUSTRIE'S quarterly report recently issued describes the past quarter's business as not inferior to that of the second quarter, and in some branches even better. In a summary of the Report the U.S. Consul at Frankfort states that chemicals and solvents showed a continued weakness. On the other hand, nitrogen fertilisers, insecticides, and rayon enjoyed increased sales. Sales of dyestuffs and auxiliary products for dye works were on the level of those for the second quarter of 1930. Rayon plants were worked to capacity, and the acetate and "Vistra" varieties were in lively demand at firm prices. Photographic chemicals and motion picture film moved at a satisfactory rate despite the business depression.

Obituary

MR. W. NELSON BROUGH (90), of Southport, for many years agent for Curtis and Harvey, Ltd. (Imperial Chemical Industries).

MR. ALBERT TAYLOR, of Penarth, near Cardiff, one of the best-known metallurgists and chemists in Wales. He was also an astronomer of note and was in charge of the eclipse expeditions to South Africa in 1891 and to Brazil in 1893.

SIR OTTO BEIT, the South African magnate, founder of the Beit Memorial Fellowship, and a great benefactor of medical research, aged 65.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

336,181. ALUMINIUM SALTS. Colloid-Chemische Forschungs Akt.-Ges., 35, Bahnhofstrasse, Zurich, Switzerland. Assignees of E. Herzfeld, 3, Hadlaubstrasse, Zurich, and H. Walker, Altdorf, Uri, Switzerland. International Convention date, January 7, 1929.

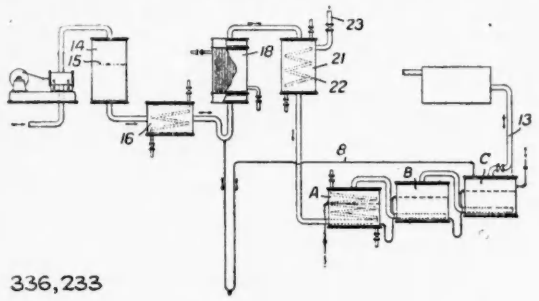
Solutions of aluminium salts containing iron are precipitated with alcohol to obtain the aluminium salt free from iron.

336,206. CARBAMATES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 1, 1929.

Ammonium carbonate, or bicarbonates of ammonia, alkali metals or magnesium, are treated under pressure with excess of liquid or gaseous ammonia to obtain ammonium carbamate, which may be mixed with carbonates of alkali metals or magnesium. The salts are separated by treating with water, aqueous or liquid ammonia, or methanol.

336,233. NITRIC ACID. W. W. Triggs, London. From E. I. Du Pont de Nemours and Co., Wilmington, Del., U.S.A. Application date, March 27, 1929.

A mixture of ammonia and tar with added oxygen is passed at a pressure of 4–10 atmospheres into an oxidation chamber 14



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containing a catalyst 15 of platinum or iron oxide. The ammonia is oxidised to nitric oxide, and the mixture passes out at 700°–900° C. through a cooler 16 and then at 250° C. to a cooler 18. The nitric oxide is then oxidised to nitrogen peroxide by means of air in the chamber 21, cooled by a coil 22. The gas then passes through absorbers A, B, C, through which the condensate from 18 is passed in counter-current. Reference is directed by the Comptroller to Specifications Nos. 221,513 and 290,679.

336,234. HYDROCARBONS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 4, 1929.

The process is for treating olefines such as ethylene, propylene, butylene, or gases obtained by cracking mineral oils, tar oils, etc., or by heating bituminous coal for a very short time to a red heat and rapidly cooling the resulting gas. The gases are subjected to heat treatment at 350°–800° C. and pressure of 1–1,000 atmospheres, in the presence of free silicon or substances containing it, such as ferro-silicon. The silicon is used in small pieces, or bricks pressed from silicon powder. The products contain higher olefines and aromatic hydrocarbons, and are employed as solvents, fuels, or anti-knock additions for motor fuels. Other gases may be present during the reaction, such as nitrogen, steam, hydrogen, etc., but if hydrogen is present, gases containing combined sulphur should also be present, and higher temperature or pressure employed to prevent the formation of saturated hydrocarbons. The reaction apparatus is constructed of material which does not cause deposition of carbon, such as alloys containing chromium and nickel, and steels containing molybdenum and tungsten, *e.g.*, tinned V2A steel.

336,251. SODIUM SULPHIDE. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 10, 1929.

Sodium sulphate is reduced with hydrogen or other gas at 500°-600° C. so that the mass remains in the solid state, to obtain anhydrous sodium sulphide. The reaction is accelerated by a small proportion of sodium sulphide, caustic soda, sulphur, iron, or nickel.

336,261. DECOMPOSING HYDROCARBONS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 10, 1929.

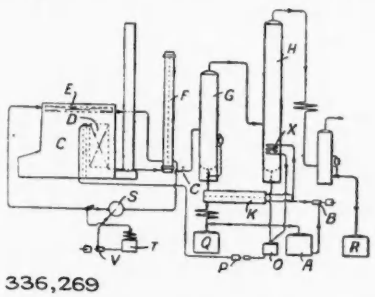
Hydrocarbons such as methane are passed through an electric arc at 2,500° C. in such amount that the ratio in cubic metres per hour to the power of the arc in kilowatts is below 0·6. The products are acetylene, hydrogen and carbon black.

336,268. DYES. I. B. Anderson, R. F. Thomson, J. Thomas, and Scottish Dyes, Ltd., Earls Road, Grangemouth. Application date, May 9, 1929.

Bz1 : Bz1^1-dibenzanthronyls substituted by phenoxy, nitro or simple amino groups but having the 2-position free, are subjected to alkali fusion. Examples are given of the treatment of phenoxy-Bz1 : Bz1^1-dibenzanthronyl to obtain a product which dyes cotton reddish-blue shades; mononitro-Bz1 : Bz1^1-dibenzanthronyl to obtain a product which dyes cotton reddish-blue shades, becoming greenish-blue on oxidation; dinitro-Bz1 : Bz1^1-dibenzanthronyl to obtain a product dyeing greenish-black to greenish-grey shades; and monoamino-Bz1 : Bz1^1-dibenzanthronyl to obtain a product which dyes bluish-red shades.

336,269. CRACKING OILS. O. D. Lucas, 49, Linden Gardens, Bayswater, London. Application date, April 10, 1929.

Oils are cracked by transfer of heat from heated liquid diphenyl or diphenyl oxide which is contained in a closed system. Oil passes from tank A through pump B to a pre-



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heating coil in a dephlegmator H and also partly to a low pressure heat exchanger K. The oil is mixed in a vessel O with oil from dephlegmator H, and passes through pump P to a coil D in a pipe still D, and then to high pressure heat exchanger F, where it is cracked by diphenyl or diphenyl oxide which is heated in a coil E in a hotter part of the still C. The cracked vapour passes to expansion chamber G and dephlegmator H, from which light oils collect in vessel R. Heavy oil passes through heat exchanger K to vessel Q. Gas oils may be cracked at 435° C. and pressure of 600 lb. per square inch by means of diphenyl oxide at 460° C. and pressure of 450 lb. per square inch.

336,276. ESTERS. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 4, 1929.

These esters are formed from polyhydric alcohols, particularly glycerine, with acids of vegetable fats or fatty oils such as linseed and olive oil. The component of lower boiling point in the form of vapour or mist is passed into the liquid higher boiling component kept at a temperature above the boiling point of the other component. Hydrogen, nitrogen or water vapour may be used as a carrier, and when hydrogen is used, hydrogenation is simultaneously effected. Catalysts such as magnesium oleate, phosphoric acid or zinc chloride may be present. The vapour is passed through in excess at such a rate that most of the higher boiling component is converted into foam.

336,282-3. FORMALDEHYDE. H. Wade, London. From The Bakelite Corporation, 247, Park Avenue, New York. Application date, July 10, 1929.

336,282. Formaldehyde is obtained by catalytic oxidation of methanol and the formation of by-products is minimised by adding a basic reagent such as ammonia, either to the gaseous mixture before oxidation or to the crude product before distillation. The addition should be sufficient to ensure that the distillate is substantially neutral.

336,283. In the above process the hot gaseous product is brought into contact with a dilute solution of formaldehyde at 20°–30° C., the volumes of gases and solutions are so proportioned that the temperature of the liquid is kept below 50° C. and the concentration of formaldehyde substantially below 30 per cent. The dilute formaldehyde solution is obtained by scrubbing the residual gases with water.

336,319 PURIFYING GASES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, July 20, 1929.

Coke oven gases, distillation gases, cracking gases, and mixtures for the manufacture of synthetic ammonia or methanol, are freed from hydrogen sulphide and carbon dioxide by washing with high boiling point hydrocarbons or phenols at a pressure above 10 atmospheres at such a temperature that the concentration of hydrogen sulphide is less than 0·3 per cent. of the gas. The washing liquid may be aliphatic hydrocarbons of the nature of middle oils, aromatic hydrocarbons such as xylene, or heavy benzol, hydrogenated hydrocarbons such as deca- and tetra-hydronaphthalene, and crude cresols.

336,339. SYNTHETIC RUBBER. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 2, 1929.

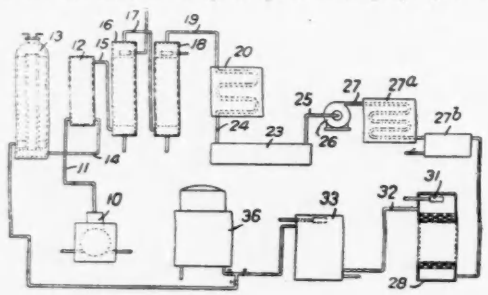
The reaction vessel in which diolefines are polymerised is provided with a lining which may be readily removed, *e.g.*, paper, cardboard, textile fabrics, leather, sheet metal, cellulose derivatives, polymerised diolefines or rubber. Waxes, fusible alloys, or bitumen may also be used, but when these are soluble in the diolefine or may affect the synthetic rubber it is necessary to provide the lining with an insoluble coating or lacquer. The lining may be removed with the polymerised product but in some cases need not be removed, *e.g.*, if it is a material required for the further treatment of the polymerised product, such as diolefine polymers, asphalt, zinc oxide, or carbon black. Several examples are given.

336,350. DYES. Imperial Chemical Industries, Ltd., Millbank, London, and R. Brightman, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, August 15, 1929.

Tetrazotised *m* : *m*^{1}-tolidine is coupled with 1 molecular proportion of salicylic acid, and with 1 molecular proportion of 2-naphthol, 2-naphthol-monosulphonic acid, 2-naphthylamine-6-sulphonic acid or 2-methyl-amino-naphthalene 7-sulphonic acid. Examples are given in which 4 : 4^1-diamino-2 : 2^1-dimethyl-diphenyl is coupled with salicylic acid and 2-naphthol-6-sulphonic acid or 2-naphthylamine-6-sulphonic acid.

336,380. CRACKING OILS. Petroleum Conversion Corporation, 136, Liberty Street, New York. (Assignees of A. P. Sachs, New York.) International Convention date, October 6, 1928.

Oils are cracked in a cyclic process employing a heated



336,380

carrier gas, and the accumulated hydrogen sulphide is removed by spraying the gas with water after it has been cooled to condense the vapour. Vapour from a still 10 and carrier gas at 1,400° F. from a stove 13 meet in a reaction chamber 12 from which the products pass to washer 16 for treatment with the crude oil. The gases pass to a rectifier 18, condenser 20 and receiver 23, while the carrier gas is pumped through a condenser 27*a* and trap 27*b* to a scrubber 31 where it is treated with water to remove hydrogen sulphide. The gas is then returned through an absorber 33 to the process.

336,394. DYE INTERMEDIATES. O. Y. Imray, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 27, 1929.

A dry alkali salt of a *p*-arylaminophenol containing a free *o*-position to the hydroxyl group and no sulphonic acid groups is treated with carbon dioxide at a raised temperature and pressure to obtain carboxylic acids. Examples describe the treatment of 4-hydroxy-diphenylamine, 4-hydroxy-2^1-methyldiphenylamine, 4-hydroxy-3^1-methyldiphenylamine, 4-hydroxy-4^1-methyldiphenylamine, 4-hydroxy-3-methyldiphenylamine, 4-hydroxy-3:4^1-dimethyldiphenylamine, and 4 hydroxy-3^1-methoxydiphenylamine.

336,412. AMINO-ALCOHOLS. Knoll Akt.-Ges., Chemische Fabriken, Ludwigshafen, and W. Klavehn, 9, Emil Heckelstrasse, Mannheim, Germany. International Convention date, July 30, 1929.

1-Phenyl-1:2-propanedione is reduced with activated aluminium in presence of water to obtain 1-phenyl-2-N-methylamino-1-propanol (ephedrine).

336,428. DYE INTERMEDIATES. W. W. Groves, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, October 14, 1929.

Specification 333,783 (see THE CHEMICAL AGE, Vol. XXIII, p. 359) describes *m*-arylaminophenol carboxylic acids, and arylides of these are made by reaction of the carboxylic group with or without previously acylating the nitrogen atom with an arylamine in presence of phosphorus trichloride and a diluent such as xylene, toluene, chlorbenzene and dimethylaniline. Alternatively, the carboxylic acid is converted to the acid chloride by thionyl chloride and then condensed with an arylamine in the presence of a diluent. A large number of examples are given.

336,495. DYES. L. Cassella and Co. Ges., Frankfort-on-Main, Germany. International Convention date, December 10, 1928. Addition to 260,998. (See THE CHEMICAL AGE, Vol. XVI, p. 69.)

Anthanthrone is halogenated in aqueous suspension in the presence of iodine or ferric chloride and an acid-binding agent. The product is purified by recrystallisation or conversion into a sulphate as described in specification 295,600 (see THE CHEMICAL AGE, Vol. XIX, p. 369).

336,512. SULPHONAMIDES. Imperial Chemical Industries, Ltd., Millbank, London. N. Bennett, St. Bede's Terrace, Widnes, Lancs., H. Dodd, Temple Cottage, Glazebrook, Manchester, and W. C. Sprent, 13, Eastern Drive, Cressington, Liverpool. Application date, January 17, 1930.

Xylene-sulphonamide is treated with methyl chloride in an autoclave under pressure in presence of caustic soda. The charge is dissolved in dilute alkali and the product precipitated by acidification. The monomethyl xylene sulphonamide is purified by distillation, decolorising carbon, or recrystallisation.

336,516. ACETYLIDES. Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler, 7, Weissfrauenstrasse, Frankfort-on-Main, Germany. International Convention date, February 7, 1929.

Alkali acetylides are obtained by continuously exposing fresh surfaces of the molten metal in a rotating tube to the action of acetylene in the absence of water and air.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—315,760 (Davis Steel Process Corporation), relating to manufacture of iron, etc., see Vol. XXI, p. 29 (Metallurgical Section) ; 317,325 (I.G. Farbenindustrie Akt.-Ges.), relating to basic product derived from oleic acid (see Vol. XXI, p. 362).

Specifications Accepted with Date of Application

338,329. Catalytic manufacture of synthetic acetic acid. Soc. Française de Catalyse Généralisée. January 26, 1929.

338,487 and 338,540. Electrode position of metals, Process and apparatus for. S. O. Cowper-Coles. May 15, 1929.

338,488. Electrolytic production or separation of tin. L. Mellersh-Jackson. (*Siemens und Halske Akt.-Ges.*) May 16, 1929.
338,507. Anyhdrides of organic acids, Manufacture of. H. D. Elkington. (*Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij.*) August 9, 1929.
338,518–9. Ketones, Manufacture of. H. Dreyfus. August 19, 1929.
338,534. Polymerisation of diolefines. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 17, 1929.
338,535. Metals, Production of—and apparatus for use in the same. J. E. Fletcher. August 19, 1929.
338,544. Obtaining light hydrocarbons by the action of nascent hydrogen on carbonaceous materials. J. Fohlen. June 21, 1929.
338,556. Treatment of ores or materials containing copper and/or nickel. E. A. Ashcroft. August 20, 1929.
338,566. Nitric acid from ammonia, Production of. N. Caro and A. R. Frank. August 13, 1929.
338,569. Distillation and rectification of alcohol. E. A. Barbet. May 16, 1929.
338,576. Destructive hydrogenation. C. F. R. Harrison, E. D. Kamm, and Imperial Chemical Industries, Ltd., July 16, 1929.
338,595. Azo-dyestuffs containing chromium, Manufacture of. I.G. Farbenindustrie Akt.-Ges. August 22, 1929. Addition to 306,843.
338,604. Condensation products containing sulphur, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) August 24, 1929.
338,624. Methylene ethers, Manufacture of. Imperial Chemical Industries, Ltd., T. Birchall, and S. Coffey. August 30, 1929.
338,631. High boiling point complex di-aryl compounds, Method of producing. J. N. Carothers, T. J. Scott, and Federal Phosphorus Co. September 5, 1929. Addition to 312,902.
338,644. Fertiliser containing urea-calcium nitrate, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 16, 1929.
338,638. Extracting phenols from phenolic tar oils. E. Perilhou. September 11, 1929.
338,655. Steel alloys. Nitralloy, Ltd. October 9, 1928.
338,672. Azo-dyestuffs, Manufacture of. I.G. Farbenindustrie Akt.-Ges. October 10, 1928.
338,688. Alloys of aluminium and iron, Method of making or re-melting. British and Dominions Feralloy, Ltd., and J. W. Bampfylde. October 21, 1929.
338,676. Non-ferrous alloys. G. H. Whiteman, and Imperial Chemical Industries, Ltd., October 14, 1929.
338,742. Alkyl halogen compounds, Manufacture of. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. January 8, 1929.
338,747. Halogenated 3:4:8:9- or 4:5:8:9-dibenzo-pyrene-quinones, Manufacture of. I.G. Farbenindustrie Akt.-Ges. December 4, 1928.
338,764. 2-Aroylbenzanthrones, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) December 16, 1929. Addition to 319,593.
338,807. 1:3-butylene-glycol, Manufacture of—by hydrogenising paraldol. I.G. Farbenindustrie Akt.-Ges. January 30, 1929.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Annable, H. W. C., and Gee, H. T. P. Separating gold and antimony contained in sulphide of antimony ores. 36,304. December 2.
Barrett Co. Distilling tar, etc. 36,516. December 3. (United States, December 11, 1929.)
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of acridine derivatives. 36,204. December 1.
—— Manufacture of anthracene derivatives. 36,511. December 3.
—— Manufacture of azo dyestuffs insoluble in water. 36,642. December 4.
—— Manufacture of liquid preparations from tribromoethyl alcohol. 36,643. December 4.
—— Manufacture of derivatives of carbazole. 36,785. December 5. (August 30, 1929.)
Cockram, C., and Holroyd, R. Hydrogenating carbonaceous materials. 36,549. December 4.
Drey, N., and Freedlands, Ltd. Synthetic resins. 36,373. December 3.
Francis, W. Pyrolysis of gaseous hydrocarbons. 36,596. December 4.
Geigy Akt.-Ges., J. R. Manufacture of poly-azo-dyestuffs. 36,153. December 1. (Germany, November 29, 1929.)
Goodwin, L. F. Manufacture of ammonium bisulphite, etc. 36,781. December 5.
Groves, W. W., and I.G. Farbenindsutrie Akt.-Ges. Manufacture of yellow dye-stuffs. 36,150. December 1.
Harper, H., and Imperial Chemical Industries, Ltd. Destructive hydrogenation of carbonaceous materials. 36,333. December 2.
Hauser and Co., Ges. Initiation of chemical reactions in closed vessels. 36,797. December 5. (Germany, February 10.)
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Manufacture of carbonyls of molybdenum and tungsten. 36,491. December 3.
—— Manufacture of molybdenum and carbonyl. 36,492. December 3.
—— Manufacture of lacquers, etc. 36,493. December 3.
—— Manufacture of metals, etc., containing carbon. 36,494. December 3.
—— Manufacture of aromatic amines from phenols. 36,599. December 4.
—— Catalytic oxidation of ammonia. 36,600. December 4.
—— Manufacture of finely-divided carbon black. 36,601. December 4.
—— Purification of crude paraffin wax. 36,602. December 4.
—— Manufacture of esters of sulpho-carboxylic acids. 36,603. December 4.
—— Apparatus for separation of volatile substances. 36,604. December 4.
—— Manufacture of metals. 36,748. December 5.
—— Apparatus for manufacture of carbon black. 36,749. December 5.
I.G. Farbenindustrie Akt.-Ges. Manufacture of derivatives of carbazole. 36,785. December 5. (August 30, 1929.)
—— Electric heater for fluids. 36,152. December 1. (Germany, November 29, 1929.)
—— Manufacture of sulphur dyestuffs. 36,513. December 3. (Germany, December 4, 1929.)
—— Manufacture of sulphur dyestuffs. 36,639. December 4. (Germany, December 4, 1929.)
Imperial Chemical Industries, Ltd. Manufacture of adhesive materials from rubber. 36,449. December 3.
—— Hydrogenating carbonaceous materials. 36,549. December 4.
—— Pyrolysis of gaseous hydrocarbons. 36,596. December 4.
Imperial Chemical Industries, Ltd., Meehan, F. T. and Mitchell, J. A. M. W. Manufacture of calcium hypochlorite products. 36,450. December 3.
Jessup, A. C. Manufacture of magnesium. 36,709. December 5.
Kali-Forschungs-Anstalt Ges. Kaselitz, O., and Uebler, B. Production of potassium nitrate. 36,747. December 5.
Mentzel, A. Preparation of sodium bicarbonate. 36,354. December 2. (Germany, December 16, 1929.)
Metallges. Akt.-Ges. Preparation of phosphorus-oxygen compounds. 36,457. December 3. (Germany, January 6.)
—— Concentrating liquids. 36,610. December 4. (Germany, December 23, 1929.)
—— Manufacture of refractory products from magnesium silicates. 36,752. December 5. (July 7.)

Industrial Chemicals in Algeria

SULPHUR, sodium chloride, sodium and potassium salts and iron and copper sulphate are the chief industrial chemicals used in large quantities in Algeria. The large French firms such as Kuhlmann and Poulenc, aided by tariff exemption, have now obtained with the exception of sulphur and copper sulphate a virtual monopoly in these products. The imports of copper sulphate, which is used entirely in agriculture, are supplied by France, Great Britain, and Italy. The sulphur which is used mostly in a colloidal form is supplied chiefly by an American firm which has established works and depots at two points in Algeria. The imports of sulphur in 1928 were 2,877 metric tons, sodium and potassium salts 17,565 tons, sodium chloride 13,876, iron sulphate 2,626, and copper sulphate 7,623 tons.—U.S. Consul Oscar S. Heizer, Algiers.

Sulphuric Acid in Poland

SULPHURIC acid is the most important industrial chemical in the Polish chemical industry, and it is estimated that two-thirds of the total consumption is used by the fertiliser industry. Sulphuric acid is produced in Poland by the roasting of zinc oxide which is found in large deposits in Upper Silesia. The increased production of phosphate fertilisers increased the demand for sulphuric acid so that the 1928 production was 287,797 metric tons compared with 238,537 tons for the previous year. Imports during 1929 were 1,604 tons compared with 861 for 1928, while the exports were 13,380 for 1929 and 29,190 for the preceding year.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID CHROMIC.—1s. per lb., less 2½% d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 11d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags. carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards).

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d in drums.

CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3¼d. per lb. Liquor, £18 10s. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall. pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised, 2s. 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4½d. per lb. nett d/d U.K., discount according to quantity; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8d. per lb. d/d U.K.

SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.

SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77°E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS.—3⅜d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included: £15 10s. f.o.b. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3½d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton d/d station in drums. Crystals—Spot, £7 10s. per ton d/d station in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5½d. to 7½d. per lb. Crude 60's 1s. 4d to 1s. 6d. per gall. August/December.

ACID CRESYLIC 99/100.—2s. 1d. to 2s. 3d. per gall. B.P., 4s. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Refined, 2s. 3d. to 2s. 5d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 1s, 10d. to 2s. Dark, 1s. 5d. to 1s. 7d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5½d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 7½d. to 8½d. per gall.; Standard Motor, 1s. 3d. to 1s. 4d. per gall.; 90%, 1s. 4½d. to 1s. 5½d. per gall.; Pure, 1s. 7½d. to 1s. 8½d. per gall. (The above prices were operative from October 21 last).

TOLUOLE.—90%, 1s. 8d. to 1s. 10d. per gall. Pure, 1s. 9½d. to 2s. 1d. per gall.

XYLOL.—1s. 4½d. to 1s. 9d. per gall. Pure, 1s. 7½d. to 1s. 11d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, for Export, 6d. to 6⅜d. per gall. Home, 4d. per gall. d/d. Middle oil, 4¼d. to 5d. per gall, Standard specification, 3d. to 4d. per gall. Light gravity, 1½d. to 1¾d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8¼d. to 8¾d. per gall. Solvent, 90/160, 1s. 2¼d. to 1s. 2¾d. per gall. Solvent, 95/160, 1s. 3¼d. to 1s. 5d. per gall. Solvent 90/190, 11d. to 1s. 2d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £3 to £5 per ton. Whizzed, £4 to £5 per ton. Hot-pressed, £8 per ton.

NAPHTHALENE.—Crystals, £10 per ton. Purified Crystals, £14 10s. per ton. Flaked, £11 per ton.

PITCH.—Medium soft, 46s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 6d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID GAMMA.—Spot, 3s. 9d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 5d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8½d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8½d. per lb. d/d buyer's works.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.

o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1 ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

p-CRESOL 34·5° C.—1s. 9d. per lb., in ton lots.

DICHLORANILINE.—2s. 5d. per lb.

DIMETHYLANILINE.—Spot, 1s. 8d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—7½d. per lb.

DINITROCHLORBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d. per lb.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb., 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—Spot, 1s. 6½d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 9d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 4d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. to £8 per ton. Grey, £14 to £15 per ton. Liquor, 9d. per gall.

ACETONE.—£74 to £75 per ton.

CHARCOAL.—£6 5s. to £8 3s. per ton, according to grade and locality.

IRON LIQUOR.—10d. to 1s. 2d. per gall.

RED LIQUOR.—8d. to 10d. per gall.

WOOD CREOSOTE.—1s. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—2s. 11d. to 3s. 1d. per gall. Solvent, 4s. per gall.

WOOD TAR.—£4 5s. per ton.

BROWN SUGAR OF LEAD.—£37 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 2d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 8d. to 1s. 10d. per lb.

BARYTES.—£6 to £7 10s. per ton, according to quality.

CADMIUM SULPHIDE.—4s. 6d. to 5s. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON BLACK.—3¼d. to 4 1/16d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity. drums extra.
CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 6d. per lb.
INDIARUBBER SUBSTITUTES, WHITE.—4¾d. to 5½d. per lb.; Dark, 4½d. to 5d. per lb.
LITHOPONE, 30%.—£20 to £22 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
VERMILION, PALE OR DEEP.—6s. 6d.–7s. per lb.
ZINC SULPHIDE.—8d. to 11d. per lb

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£38 5s. per ton, for ½ ton lots, £37 5s. for 1 ton, smaller quantities £39 5s., delivered, barrels free.
ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., for synthetic product, according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 2d. to 1s. 2½d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. to 1s. 0½d. per lb., less 5%.
AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.
AMMONIUM BENZOATE.—3s. 9d. per lb.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ARGENT. NITRAS, CRYSTALS.—1s. 1d. per oz.
ATROPHINE SULPHATE.—8s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BISMUTH CARBONATE.—7s. 6d. per lb.
BISMUTH CITRATE.—7s. 6d. per lb.
BISMUTH SALICYLATE.—7s. 3d. per lb.
BISMUTH SUBNITRATE.—6s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 5s. per lb.
BISMUTH OXIDE.—9s. 6d. per lb.
BISMUTH SUBCHLORIDE.—8s. 9d. per lb.
BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Qts., 10d. per lb.; 36 W. Qts., 9½d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 4½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.
CAFFEIN, PURE.—6s. 6d. per lb.
CAFFEIN CITRAS.—5s. per lb.
CALCIUM LACTATE.—B.P., 1s. to 1s. 6d. per lb., in 1-cwt. lots.
CAMPHOR.—Refined flowers, 2s. 10d. to 3s. per lb., according to quantity; also special contract prices.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
EMETINE HYDROCHLORIDE.—58s. 6d. per oz.
EMETINE BISMUTH IODIDE.—33s. per oz.
EPHEDRINE, PURE.—12s. 6d. to 13s. 6d. per oz.
EPHEDRINE HYDROCHLORIDE.—9s. 9d. to 10s. 6d. per oz.
EPHEDRINE SULPHATE.—9s. 9d. to 10s. 6d. per oz.
ERGOSTEROL.—2s. 6d. per gm.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—27s. 6d. per oz.
HYDRASTINE HYDROCHLORIDE.—85s. per oz. for small quantities.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; fo r28-lb. lots.
IRON AMMONIUM CITRATE.—B.P., 2s. 2d. per lb., for 28-lb. lots. Green, 2s. 9d. per lb., list price. U.S.P., 3s. per lb. list price.
IRON PERCHLORIDE.—18s. to 20s. per cwt. according to quantity.
IRON QUININE CITRATE.—B.P., 8¼d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 14s. 3d. per lb. net; Synthetic, 8s. 6d. to 10s. 6d. per lb.; Synthetic detached crystals, 8s. 6d. to 10s. 3d. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.
PILOCARPINE NITRATE.—10s. 6d. per oz.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—88s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 1s. 10d. to 2s. 3d. per lb.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.
POTASSIUM IODIDE.—16s. 8d. to 17s. 9d. per lb., as to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1 cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.
QUINOPHAN.—B.P.C., 14s. 6d. to 16s. 6d. per lb. for cwt. lots.
SACCHARIN.—43s. 6d. per lb.
SALICIN.—18s. 6d. per lb.
SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.
SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.
SODIUM CITRATE.—B.P.C. 1911, 1s. 6d. to 1s. 11d. per lb. B.P.C. 1923, and U.S.P., 1s. 10d. to 2s. 3d. per lb.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—85s. per cwt. net, ton lots, d/s of 5 cwt. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 7s. 3d. to 8s. per lb., according to quantity. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL CINNAMIC ALDEHYDE.—9s. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—6s. 3d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 9d. per lb
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 9d. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.
COUMARIN.—12s. per lb.
CITRONELLOL.—7s. 6d. per lb.
CITRAL.—7s. 6d. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—8s. 9d. per lb.
GERANIOL (PALMAROSA).—17s. per lb.
GERANIOL.—7s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. per lb.
ISO EUGENOL.—10s. 9d. per lb.
LINALOL, EX BOIS DE ROSE.—6s. per lb. Ex Shui Oil, 6s. per lb.
LINALYL ACETATE, EX BOIS DE ROSE.—8s. 6d. per lb. Ex Shui Oil, 8s. 6d. per lb.
MUSK KETONE.—30s. per lb.
MUSK XYLOL.—6s. 3d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—9s. per lb.
RHODINOL.—42s. per lb.
SAFROL—1s. 6d. per lb.

(*Essential Oils on page 561.*)

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co. Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, December 11, 1930.

PRICES during the current week have been maintained with a fair amount of inquiry. The improved export trade has also been maintained.

General Chemicals

ACETONE unchanged at £71 10s. to £80 per ton according to quantity, with a good demand.

ACID ACETIC.—Steady at £36 5s. to £38 5s. per ton for technical 80% and £37 5s. to £39 5s. per ton for pure 80% with a regular demand.

ACID CITRIC.—Still unsteady at about 1s. 3d. per lb. ex wharf, London.

ACID FORMIC.—Firm at about £38 per ton for 85% and in good request.

ACID LACTIC.—Firm at £41 to £42 per ton for the 50% by weight, pale quality, and in steady request.

ACID OXALIC.—Unchanged at £30 7s. 6d. to £32 per ton according to quantity, with a good demand.

ACID TARTARIC.—Continues firm at 1s. to 1s. 1d. per lb., less 5%.

ALUMINA SULPHATE.—£7 15s. to £8 5s. for the 17/18% iron free quality. The active demand continues.

ARSENIC.—Firm at £19 to £19 10s. per ton, with a steady demand.

CREAM OF TARTAR.—Firm at about 88s. per cwt., ex warehouse, London, and in steady request.

COPPER SULPHATE.—Continues firm at about £22 to £22 10s. per ton, less 5%, free-on-rails, London.

FORMALDEHYDE.—Steady at about £32 per ton, ex warehouse, London.

LEAD ACETATE.—Unchanged at £35 15s. per ton for white, with brown £1 per ton less.

LEAD NITRATE.—Steady at about £29 10s. per ton.

LITHOPONE.—£18 to £20 per ton according to grade and quantity, with a good demand.

POTASSIUM BICHROMATE.—Firm at 4¼d. per lb., with the usual discounts for quantities.

POTASSIUM CARBONATE.—£28 to £29 per ton for the 96/98% arsenic free quality.

PERMANGANATE OF POTASH NEEDLE CRYSTALS B.P.—In good demand and firm at 5½d. per lb.

SODA BICHROMATE.—Firm at 3½d. per lb., with the usual discounts for contracts and in good demand.

CHLORATE OF SODA.—Firm at about £25 per ton.

SODIUM HYPO SULPHATE.—Commercial crystals, £8 10s. per ton; photographic crystals, £14 5s. per ton.

SODIUM SULPHIDE.—£10 5s. to £11 5s. per ton for solid, £1 per ton extra for broken, carriage paid.

TARTAR EMETIC.—Rather quiet at about 11d. per lb.

ZINC SULPHATE.—Unchanged at about £11 to £11 10s. per ton.

Coal Tar Products

There is no change to report in the coal tar product market from last week. Conditions and prices remain the same.

MOTOR BENZOL.—Unchanged, at about 1s. 5½d. to 1s. 6½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Quoted at about 1s. 2½d. to 1s. 3d. per gallon.

HEAVY NAPHTHA.—Remains at about 1s. 1d. per gallon f.o.r.

CREOSOTE OIL.—Quoted at 3d. to 3½d. per gallon f.o.r. in the north, and at 4d. to 4¼d. per gallon in London.

CRESYLIC ACID.—Unchanged at 1s. 8d. per gallon for the 98/100% quality, and at 1s. 6d. per gallon for the dark quality 95/97%.

NAPHTHALENES.—Remain at £3 10s. to £3 15s. per ton for the fire-lighter quality, at about £4 to £4 5s. per ton for the 74/76 quality, and at about £5 per ton for the 76/78 quality.

PITCH.—Worth 37s. 6d. to 42s. 6d. per ton, f.o.b. East Coast Port.

THE following additional prices have been received :—

Carbolic Acid.—Business is of moderate dimensions, 5 ton lots being quoted at 5½d. and small quantities at 6¼d. per lb., in large packages.

Cresylic Acid 98/100%.—Quoted to-day at 1s. 9d. to 1s. 11d. Refined grade at 2s. 3d. to 2s. 4d. per gallon.

Aspirin.—Prices are unchanged at 2s. 9d. to 2s. 11d. per lb.

Phenolphthalein.—Business is being conducted at previous rates of 5s. 11d. to 6s. 1½d. per lb.

Vanillin—Clove Oil.—Material is quoted at 14s. per lb. in 1 cwt. lots.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—The price for sulphate of ammonia remains unchanged. As supplies appear to be plentiful, buyers are still tending to hold off. *Home.*—The home market continues quiet. Merchants seem to be in no hurry to cover their spring requirements.

NITRATE OF SODA.—The exceptional dullness reported last week continues both in Europe and the United States.

Latest Oil Prices

LONDON, December 10.—LINSEED OIL was quiet and 2s. 6d. to 5s. per ton lower. Spot, £27 10s.; December, £23 10s.; January-April, £21 5s.; May-August, £20 5s.; September-December, £20 17s. 6d., naked. RAPE OIL was dull. Crude extracted, £30 10s.; technical refined, £32, naked, ex wharf. COTTON OIL was quiet, Egyptian crude, £23; refined common edible, £28; deodorized, £30, naked, ex mill. TURPENTINE was dull and 3d. per cwt. lower. American, spot, 34s. 3d.; January-April, 35s. 3d.; Russian, spot, 31s. 9d. per cwt.

HULL.—LINSEED OIL, naked, closed for spot at £23; December, £22 10s.; January-April, £21 10s.; May-August, £20 15s.; East Indian, spot, £25; Baltic, spot, £28. COTTON OIL, naked, Egyptian crude, spot, £22 10s.; edible refined, spot, £25 10s.; technical, spot, £25 5s.; deodorized, spot, £27 10s. PALM KERNEL OIL.—Crude, naked, 5½ per cent., spot, £25. GROUNDNUT OIL.—Crushed extracted, spot, £29 10s.; deodorized, spot, £33 10s. SOYA OIL.—Extracted and crushed, spot, £24 10s.; deodorized, spot, £28. RAPE OIL.—Crushed extracted, spot, £30; refined, spot, £32 per ton. TURPENTINE, CASTOR, and COD unchanged. Net cash terms, ex mill.

South Wales By-Products

THERE is slightly more activity in South Wales by-products. The demand for pitch has widened, and there are indications that the patent fuel makers and other big users are coming back into the market. Quotations are unchanged. Solvent naphtha has a better call, with values unchanged, but heavy naphtha has a dead market There is a fair and steady call for road, with values unchanged at about 13s. per 40-gallon barrel. Refined tars continue to have a steady market, with quotations unchanged for gasworks and coke-oven tar. Creosote continues to have a weak market, but motor benzol is in fair demand. Patent fuel and coke exports are better, and the outlook is more satisfactory. Patent fuel prices for export are: 21s. to 21s. 6d., ex-ship Cardiff; 20s., ex-ship Newport; 20s., ex-ship Swansea. Coke prices are: Best foundry, 34s. to 36s. 6d.; good foundry, 26s. to 30s.; furnace, 17s. to 18s.

Scottish Coal Tar Products

THIS market remains practically dormant, although the forward position continues to receive some attention. Stocks of almost all products are large, and there is no sign of any immediate improvement.

Cresylic Acid.—The lower values reported last week have not stimulated any great interest. Pale, 99/100%, 1s. 7d. to 1s. 8d. per gallon; pale, 97/99%, 1s. 6d. to 1s. 7d. per gallon; dark 97/99%, 1s. 5d. to 1s. 6d. per gallon; high boiling acid, 1s. 7d. to 1s. 9d. per gallon; all f.o.r. in buyers' packages.

Carbolic Sixties.—With no business passing, value is nominal at about 1s. 10d. per gallon for best grades.

Creosote Oil.—A certain volume of business is being transacted, but Specification oil is dull. Values are lower as follows :—Specification oil, 2½d. to 2¾d. per gallon; gas works ordinary, 3d. to 3¼d. per gallon; washed oil, 3d. to 3¼d. per gallon; all f.o.r. in bulk.

Coal Tar Pitch.—Conditions are unchanged. Export value is 42s. 6d. to 45s. per ton, f.a.s. Glasgow and home, about 45s. per ton, ex works—both in bulk.

Blast Furnace Pitch.—Controlled prices remain at 30s. per ton, f.o.r. works for home trade, and 35s. per ton, f.a.s. Glasgow, for export.

Refined Coal Tar.—For large contracts for forward delivery quotations are a fraction lower than to-day's price of 3d. to 3¼d. per gallon, ex makers' works in buyers' packages.

Blast Furnace Tar.—Unchanged at 2¾d. per gallon, f.o.r.

Crude Naphtha.—Supplies are scarce and value is steady at 4d. to 4¼d. per gallon in bulk quantities, f.o.r.

Water White Products.—Very few orders are being placed. Motor benzole, 1s. 4d. to 1s. 4½d. per gallon; 90/160 solvent, 1s. 2d. to 1s. 3d. per gallon; 90/190 heavy solvent, 1s. to 1s. 0½d. per gallon—all ex makers' works.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, December 9, 1930.

THE Scottish heavy chemical market has during the past week shown little improvement. Business still remains steady,

Industrial Chemicals

ACETONE.—B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered free Great Britain in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at the same price, viz.: 3¼d. per lb., ex store. On offer from the Continent at 3½d. per lb., ex wharf.

ACID, SULPHURIC.—£3 2s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11¾d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £8 15s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10¼d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £31 per ton, ex wharf. On offer for shipment from China at about £29 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £21 per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £22 5s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £10 10s. per ton, c.i.f. U.K. ports. For Continental materials our price would be £10 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or at £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £33 per ton, ex store. Continental on offer at about £32 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £33 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £46 per ton, carriage paid.

LEAD, ACETATE.—White crystals quoted round about £38 to £39 per ton ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE.—GROUND CALCINED.—Quoted £9 per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 1s. 8d. per gallon less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £25 10s. per ton ex store. Offered from the Continent at £24 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £25 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums, all carriage paid, buyer's station, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 27s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Chilean producers now offer at £9 15s. per ton, carriage paid, buyer's sidings, minimum six-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices, 55s. per ton, ex works; 57s. 6d. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

(*Continued from page 559.*)

Prices of Essential Oils

BERGAMOT OIL.—8s. 9d. per lb.

POURBON GERANIUM OIL.—16s. 6d. per lb.

CINNAMON OIL LEAF.—6s. 3d. per oz.

CLOVE OIL, 90/92%.—8s. 3d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 9s. 3d. per lb.

LEMON OIL.—4s. 6d. per lb.

PEPPERMINT OIL.—Wayne County, 9s. 6d. per lb.

Sweden's Central Cellulose Laboratory

For the Service of the Industry

THE Swedish Cellulose Co., comprising the group of mills controlled by the Kreuger and Toll Co., is to build a central laboratory for research and control of the various brands of cellulose produced at the mills. The laboratory will be situated in the Sundsvall district and connected with the Oestrand mill now being built there. The concern hopes that this step will be of benefit for standardising the qualities and facilitating the co-operation with the customers of the concern abroad. Mr. Goesta Hall, one of the leading scientific pulp and paper experts, now with the Korsnaes Co., has been appointed director of the laboratory.

The new laboratory is expected to be a technical organisation of considerable importance, and is regarded as a vital link in the work of this powerful concern in bringing its manufacturing methods and equipment up to the highest standard of modern technique and efficiency. The Swedish Cellulose Co., one of the principal Swedish investments of the Kreuger and Toll Co., comprises 11 large pulp and sawmill companies, manufacturing about 25 per cent. of the total Swedish output of sulphite cellulose, 20 per cent. of the sulphate cellulose, and 19 per cent. of Sweden's annual export of wood. The company also owns 2,000,000 hectares of wood land and a dozen hydroelectric plants.

The Oestrand pulp mill, in connection with which the new laboratory will work when completed, will be the largest and most modern unit of its kind in the world, with an annual output of up to 100,000 tons of pulp. The laboratory is an instance of the modern "service" principle, being designed to study and to meet the requirements of the different customers abroad in relation to quality and special specifications.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, December 11, 1930.

With the approach of the tail-end of the year, there is a tendency for business on the chemical market to quieten off, and the probability is, if the experience of previous years is anything to go by, that this will be accentuated now until after the turn. On the other hand, a certain amount of interest in forward contract buying has been reported in some quarters, although, as before, the bulk of the current business relates to prompt or early delivery possessions. With regard to prices, these are generally steady.

Heavy Chemicals

There is a quiet movement in the case of chlorate of soda, with offers maintained in the region of £23 per ton. Sulphide of sodium is quoted on contract for next year's delivery at from £10 to £11 per ton for the British 60/65 per cent. concentrated solid quality, with the commercial product at up to £9 2s. 6d. Phosphate of soda meets with a moderate enquiry and values are steady at about £10 per ton for the dibasic material. A quiet business is going through in the case of hyposulphite of soda, current offers of which are at round £15 per ton for the photographic grade and £9 5s. for the commercial. Bicarbonate of soda is firm and a fair trade is reported at about £10 10s. per ton. Prussiate of soda keeps up at from 4¾d. to 5¼d. per lb., according to quantity, a quiet demand being experienced in this section. Contract offers of caustic soda for next year are maintained on the basis of from £12 15s. to £14 per ton, according to quality, in 4-ton lots; a moderate amount of buying is going on. Bichromate of soda is in quiet demand at the higher rate for 1931 delivery, contract offers being on the basis of 3½d. per lb., less 1 to 2½ per cent., according to quantity. There has been no change in the price position of alkali, values being in the neighbourhood of £6 per ton. Saltcake is firm and prices are fully maintained at round £3 per ton, a moderate amount of business in this material being done.

Bichromate of potash is the turn dearer for delivery over next year, contracts being on the basis of 4¼ per lb., less 1 to 2½ per cent. There is a fair amount of inquiry about in the case of yellow prussiate of potash, and quotations are well held at from 6¾d. to 7¼d. per lb., according to quantity. The demand for caustic potash is not particularly active at the moment, but at from £28 10s. to £29 per ton there has been very little alteration in the price position. Permanganate of potash is steady, although not a great deal of business is offering just now; the B.P. grade is quoted at up to 5½d. per lb., and the commercial at 5¼d. Chlorate of potash is fairly steady at round £25 per ton, with enquiry on quiet lines. Carbonate of potash is in moderate request at about £25 per ton for the 98 per cent. quality.

Sulphate of copper is not quotably changed on balance, although the price outlook is rather uncertain; current offers range from about £21 to £21 10s. per ton, f.o.b. With regard to arsenic, supplies of this for prompt delivery are not excessive and prices keep up at about £18 10s. per ton at the mines for white powdered, Cornish makes. The lead products are moving off in somewhat limited quantities but values are about held at £34 to £34 10s. per ton for brown acetate and round £35 for white, with nitrate at about £29 10s. per ton. The acetates of limes are still on offer here at round £14 10s. per ton for the grey material and £7 10s. for the brown.

Acids and Tar Products

Tartaric acid is on offer at from 1s. 0¼d. to 1s. 0¾d. per lb., a quiet demand being reported. Citric acid is easier at about 1s. 3½d. per lb. but sales at the moment are not extensive. Oxalic acid is in moderate request, with prices maintained at about £1 12s. per cwt., ex store. Acetic acid is well held at up to £51 per ton for the glacial quality and about £37 per ton for the 80 per cent. commercial.

There is only a moderate call for pitch, quotations for which range from about 42s. 6d. to 45s. per ton f.o.b. Creosote oil is steady and in fair request at up to 4¼d. per gallon, naked, at works. Carbolic acid continues slow and easy at round 1s. 4d. per gallon, naked, for 60's crude material, and 5½d. per lb. for crystals. Solvent naphtha is on the short side at about 1s. 2¾d. per gallon, naked, at works.

Company News

Reckitt and Sons.—An interim dividend of 3¾ per cent., less tax, has been declared on the ordinary shares, payable on January 1.

Sulphide Corporation.—The directors have declared a dividend of 5 per cent. on the preference shares, to be paid out of the profit earned during the year ended June 30 last.

Bleachers' Association, Ltd.—At a meeting in Manchester on December 5, the directors decided not to pay any interim dividend on the ordinary shares in respect of the year ending March 31, 1931.

Joseph Nathan and Co., Ltd.—The accounts for the year ended September 30 last, show a net profit, subject to audit of £68,037, as compared with £65,377 last year. It is proposed to recommend the payment of the usual dividend on the 400,000 10s. 8 per cent. preferred ordinary shares and also a dividend of 10 per cent. on the 637,080 1s. ordinary shares, both less tax.

Santa Catalina Nitrate Co.—The interest and sundry receipts for the year to June 30 were £2,777, which with £337 brought in, makes £3,114, from which has to be deducted London expenses £1,781, income and other taxes in Chile £563, legal charges £318, leaving £452. Re-transfer from reserve account of £1,000 makes £1,452, which permits writing off of stoppage of works expenses £1,107, leaving to be carried forward £345.

United Indigo and Chemical Co., Ltd.—At a meeting of the directors of the company held on November 25, it was decided to pay an interim dividend of 5 per cent. per annum for the six months ending December 31 on the participating cumulative preference shares. (Subject to income tax)

Metafilters (1929).—The first report for the period from May 1, 1929, to September 30, 1930, shows a gross profit on trading of £3,874. After providing for administrative expenses, depreciation, etc., the net loss is £7,519. The directors propose that the loss should be carried to research and development account, making it £13,070. The directors state that prospects are retarded by insufficiency of working capital, and proposals in this connection will be formulated at the annual meeting and subsequently circulated to shareholders.

Eastern Chemical Co.—The result of working for the year ended March 31, 1930, after maintaining plant, cost of which has been charged to revenue, but without allowing for depreciation, was a loss of £758 (against loss of £330). The directors do not consider it necessary to pass anything to depreciation reserve this year, as re-valuation figures show that book value of land, buildings and plant, less the sum now standing at depreciation reserve, is still below the net re-valuation figure, adjusted to March 31, 1930. Profit and loss account now shows a debit of £21,874.

Bituminous Compositions.—For the 18 months ended September 30 last, the report states that the net trading profits were £7,266, to which is added transfer fees, etc., making £7,310. After deducting directors' fees £494, reserve for income tax £750, reserve for depreciation £500, preliminary expenses written off £1,197, brokerage on shares written off £967, interim dividend on ordinary shares £823, a sum of £2,579 is left. The directors recommend a final dividend of 3½ per cent. on the ordinary shares, fully paid on September 30 (making 7 per cent. for the period) £892, carrying forward £1,687.

British Benzol and Coal Distillation.—The report for year ended October 31, 1930, states that works did not reach production period until end of first week in December, 1929. Trading results for remainder of year under review show a profit of £6,433. After charging overhead expenses, interest, etc., but without allowing for depreciation, there is a loss for the year of £2,724, which with a debit balance of £486 brought forward makes a total debit balance at profit and loss account of £3,210. Starting-up expenses account for £1,475, leaving actual loss of £1,250 for the 11 months during which the company was producing, the whole of which was incurred in the last four months. Some further loss is anticipated owing to stoppage of work at Bedwas Colliery since November 8, 1930.

British Oxygen Co.—An interim dividend of 3 per cent., is announced, payable to shareholders registered on December 4.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

BENTLEY (J. E.) AND CO., LTD., Halifax, dyers, bleachers, etc. (M., 13/12/30.) Registered November 24, debenture to Lloyds Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *£4,000. April 12, 1930.

GAMLEY'S, LTD., Eastbourne, manufacturers of photographic apparatus, etc. (M., 13/12/30.) Registered November 28, debenture to Barclays Bank, Ltd. securing all moneys due or to become due to the Bank; general charge. *Nil. April 29, 1930.

MALONEY (C. E.) AND CO., LTD., Gillingham (Dorset), soap manufacturers. (M., 13/12/30.) Registered November 27, £4,000 mortgage to J. W. Hull, Stainsford, Dorchester, farmer (ranking in priority to mortgage registered January 14, 1920, and debenture registered December 10, 1929); charged on Dinton Brick Tile and Pottery Works, Dinton. *£29,000. December 31, 1929.

SILVER SPRINGS BLEACHING AND DYEING CO., LTD., Congleton. (M., 13/12/30.) Registered November 19, £2,980 further charge, to North Staffordshire Permanent Economic Benefit Building Society, Newcastle-under-Lyme; charged on properties at Buglawton, etc.; also registered November 19, an agreement providing priority for such further charge and also the mortgages and charges therein referred to, over moneys secured by Trust Deeds dated June 21, 1901, September 26, 1902, and April 6, 1904. *£22,678. September 22, 1930.

WIGGINS TEAPE AND CO. (1919), LTD., London, E.C., paper manufacturers. (M., 13/12/30.) Registered November 25, disposition (supplemental to Trust Deed dated May 30, 1930, securing £1,000,000 debenture stock and any further stock not exceeding £250,000); charged on properties at Cathcart (N.B.) etc. *£1,000,000. May 27, 1930.

Satisfaction

ENGLISH TEXTILOSE MANUFACTURING CO., LTD., Manchester.—Satisfaction registered November 19, all money, etc., registered November 10, 1921.

Receivership

OSMOS SALTS, LTD. (R., 13/12/30.) T. F. Miller, of 61½, Fore Street, E.C.2, was appointed Receiver and Manager on November 18, 1930, under powers contained in debentures dated July 29, 1925.

London Gazette, &c.

Winding-Up Petition

SABULITE (GREAT BRITAIN), LTD. (W.U.P., 13/12/30) A creditor's petition for winding-up of the company was presented on December 2 by T. and R. W. Bower, Ltd., Durham, and is to be heard at the Royal Courts of Justice, Strand, London, on Monday, December 15.

Companies Winding Up

J. M. NEWTON VITREO-COLLOID (1928), LTD. (C.W.U., 13/12/30.) Winding up Order, December 1.

INTERNATIONAL COLLOIDAL SYNDICATE, LTD. (C.W.U., 13/12/30.) Meetings December 16 at 33, Carey Street, Lincoln's Inn, London, W.C.2; creditors 2.30 p.m., and contributories 3 p.m.

PEET AND CO., LTD., Sydenham Dyeworks, Otley Road, Bradford. (C.W.U., 13/12/30.) Meetings December 17 at Official Receiver's Office, 12, Duke Street, Bradford; creditors 11 a.m., contributories 11.30 a.m.

METAL, ORE AND CHEMICAL CO., LTD. (C.W.U., 13/12/30.) F. S. Salaman, 1 and 2, Bucklersbury, London, E.C.4, appointed as Liquidator, November 25.

Companies Winding Up Voluntarily

COLOIL SYNDICATE, LTD. (C.W.U.V., 13/12/30.) Statutory meeting of creditors at Winchester House, Old Broad Street, London, E.C.2, Tuesday, December 16 at 3 p.m.

PETROLEUM ENGINEERING AND DEVELOPMENT CO., LTD. (C.W.U.V., 13/12/30.) Statutory meeting of creditors at 20, Kingsway, London, W.C.2, on December 23rd at 12 noon.

VEGETABLE OIL MACHINERY SYNDICATE, LTD. (C.W.U.V., 13/12/30.) Statutory meeting of creditors at 14, Ridgefield, John Dalton Street, Manchester, on Wednesday, December 10, at 3 p.m.

WEST RIDING SINTERING CO., LTD. (C.W.U.V., 12/12/30.) By special resolution November 21. A. B. Fraser, of Tingley Hall, near Wakefield, appointed as Liquidator.

Declarations of Solvency

[Registered under Section 230 of the Companies Act, 1929. It must be understood that (a) a company which has filed a Declaration of Solvency may be proposing to wind up with a view to reconstruction, and (b) it does not necessarily follow that a company which has filed such declaration will actually pass a resolution to wind up.]

STANDARD AMMONIA CO., LTD., 37, King William Street, E.C.4, chemical manufacturers, etc. Declaration of solvency filed December 5, 1930.

WELLINGTON AND WARD, LTD., Shenley Road, Boreham Wood, Elstree, manufacturers of photographic plates, papers and films, etc. Declaration of solvency filed December 5, 1930.

New Companies Registered

ALMERIA SULPHUR CO., LTD., 10/12, Broad Street Avenue, E.C.2. Registered December 4. Nominal capital, £2,000 in 5s. shares. To acquire and turn to account any mines, mining rights and metalliferous land in any part of the world.

COVENTRY METALLURGICAL CO., LTD., 2, Stoneleigh Terrace, Coventry. Registered December 4. Nominal capital, £10,000 in £1 shares. To carry on the business of manufacturers of or dealers in articles or alloys made of any precious or non-precious metals, refiners of and dealers in residues containing precious or non-precious metals, analytical and consulting chemists, etc. Directors: F. W. Miles and F. W. Miles, Jun.

FILTRATORS, LTD., Astor House, Aldwych, W.C. Registered December 4. Nominal capital, £1,500 in 1s. shares. To adopt an agreement with C. Hennion, to carry on any business relating to disincrustants and apparatus for use in connection with steam boilers, and to carry on the business of mechanical, electrical, hydraulic and general engineers, etc. Directors: C. Hennion, W. E. Jardine, C. O. Fletcher, A. T. Ridout, J. Paynter.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

BELGIUM AND LUXEMBURG.—A chemist established at Tournai desires to obtain the representation of British manufacturers of pharmaceuticals, dyes and industrial and agricultural chemicals. (Ref. No. 504.)

BRITISH INDIA.—The Indian Stores Department is calling for tenders, to be presented in New Delhi by December 22, for the supply of lubricating oils and greases. (Order No. H. 8,809. (Ref. No. B.X. 6,916.)

EGYPT.—The Egyptian Ministry of Public Works is calling for tenders, to be presented in Cairo by January 26, 1931, for the supply of 3,500 metric tons of asphalt required by the Tanzim Department, Cairo. (Ref. No. B.X. 6,909.)

GERMANY.—A firm in Hamburg wishes to represent a London firm dealing in drugs and essential oils. (Ref. No. 508.)